

# Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO N6247318F5065 RSY Pad Data Report							
RSY Pad: RSY 2 Use 1	Soil Origin: TU-077A SFU						
Data attached and submitted by: Amy Mangel	Data Report Submittal Date: 08/24/2020						

Systematic Soil Sample Data: RSY 2 Use 1							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	<sup>90</sup> Sr Final Analytical Results (pCi/g)
<b>Project Remediation Goals*</b>					1.861	0.141	0.331
HPPG-SFU-TU077A-001	1	Systematic	10,699	16,729	0.530	0.00750	0.111
HPPG-SFU-TU077A-002	2	Systematic	11,174	16,729	0.403	-0.0564	N/A
HPPG-SFU-TU077A-003	3	Systematic	10,052	16,729	0.133	0.0120	N/A
HPPG-SFU-TU077A-004	4	Systematic	9,766	16,729	0.405	0.0338	N/A
HPPG-SFU-TU077A-005	5	Systematic	9,164	16,729	0.580	-0.0361	N/A
HPPG-SFU-TU077A-006	6	Systematic	9,188	16,729	0.404	-0.0452	N/A
HPPG-SFU-TU077A-007	7	Systematic	8,486	16,729	0.504	-0.0677	N/A
HPPG-SFU-TU077A-008	8	Systematic	9,618	16,729	0.325	0.00150	N/A
HPPG-SFU-TU077A-009	9	Systematic	9,031	16,729	0.435	0.0257	N/A
HPPG-SFU-TU077A-010	10	Systematic	9,342	16,729	0.393	0.00519	N/A
HPPG-SFU-TU077A-011	11	Systematic	8,909	16,729	0.294	0.0158	0.0243
HPPG-SFU-TU077A-012	12	Systematic	8,894	16,729	0.247	0.0359	N/A
HPPG-SFU-TU077A-013	13	Systematic	9,828	16,729	0.526	0.0176	N/A
HPPG-SFU-TU077A-014	14	Systematic	9,472	16,729	0.525	0.0236	N/A
HPPG-SFU-TU077A-015	15	Systematic	9,227	16,729	0.502	-0.0461	N/A
HPPG-SFU-TU077A-016	16	Systematic	8,562	16,729	0.240	0.0179	N/A
HPPG-SFU-TU077A-017	17	Systematic	8,209	16,729	0.266	0.0182	N/A
HPPG-SFU-TU077A-018	18	Systematic	9,501	16,729	0.328	0.0220	N/A
HPPG-SFU-TU077A-019	19	Systematic	9,066	16,729	0.340	-0.00757	N/A
HPPG-SFU-TU077A-020	20	Systematic	9,825	16,729	0.356	-0.0373	N/A
HPPG-SFU-TU077A-021	21	Systematic	9,404	16,729	0.181	0.0213	0.150
HPPG-SFU-TU077A-022	22	Systematic	10,993	16,729	0.794	-0.00574	N/A
HPPG-SFU-TU077A-023	23	Systematic	9,667	16,729	0.372	-0.0250	N/A
HPPG-SFU-TU077A-024	24	Systematic	10,362	16,729	0.399	0.0306	N/A
HPPG-SFU-TU077A-025	25	Systematic	10,121	16,729	0.451	0.0286	N/A
<b>Soil Systematic Sample Statistics</b>					<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	<sup>90</sup> Sr Final Analytical Results (pCi/g)
					Maximum	0.794	0.0359
					Mean	0.3965	-0.0006
					Median	0.399	0.012
					Minimum	0.133	-0.0677
					Standard Deviation	0.1353	0.0303
							N/A

Biased Soil Sample Data: RSY 2 Use 1							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	<sup>90</sup> Sr Final Analytical Results (pCi/g)
<b>Project Remediation Goals*</b>					1.861	0.141	0.331
HPPG-SFU-TU077A-B-001	1	Biased	9,235	16,729	0.463	0.000	-0.0359

CPM Counts per minute

pCi/g Picocuries per gram

\* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-06042021-PG-ROV2-604	06/04/2021	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-06072021-PG-JSS-612	06/07/2021	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-06082021-PG-JSS-615	06/08/2021	3x3	05/12/2022	117336
Biased Sample Survey	HPRS-06092021-PG-JSS-622	06/09/2021	3x3	05/12/2022	117336

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (351 keV)
ROI 10	Gross Gamma

Summary: RSY 2 Use 1
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 69 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
2) One-minute static follow-up measurements with the RS-700 were collected at 69 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 9. The net follow-up static spectra are presented on pages 14-82. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 10). TestAmerica sample results are attached (pages 83-120). Ten percent of the systematic soil samples (three samples in total -001, -011, & -021) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 83-120). Samples HPPG-F-065 and HPPG-F-066 are field duplicates, correlating to systematic samples -013 and -015. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of field duplicates for the project.
Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 12-13. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1, one biased sample was collected from the location of the highest gross gamma scan measurement, since all follow-up static measurements were below the ROC-specific critical levels. TestAmerica sample results are attached (pages 121-137). A map of the biased sample location is presented on page 11. Biased sample results were all below the applicable RGs.
<b>Conclusions:</b>  In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background.  RSY 2 Use 1 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation TU-077A SFU.  APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for TU-077.

## Soil Scan Statistics

### Statistical Summary

Dataset		PG-RSY-02-U1				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		1.00	25.05	10.72	11.02	3.40
ROI-06		45.10	127.26	77.05	76.66	10.34
ROI-07		27.05	94.20	59.49	59.12	8.82
ROI-08		59.11	148.31	98.85	98.20	12.41
ROI-10		1,702.35	2,500.05	2,099.43	2,086.21	129.57

### Statistical Summary Reference Background

TYPE		Scan RBA (Bldg 809)				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	33.08	16.21	16.04	4.13
ROI-06		68.15	177.45	117.58	117.26	15.50
ROI-07		51.11	141.33	92.34	91.24	13.43
ROI-08		93.19	221.48	146.24	145.30	18.21
ROI-10		2,354.11	3,845.31	2,995.57	2,989.64	255.66

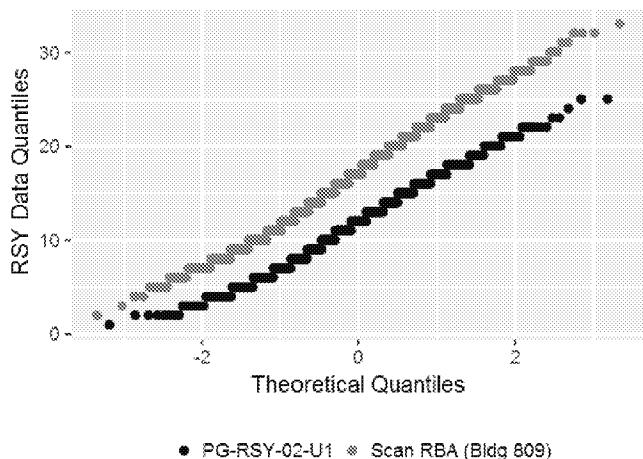
cps = counts per second

Dataset	Number of Data Points
PG-RSY-02-U1	3642
Scan RBA (Bldg 809)	4705

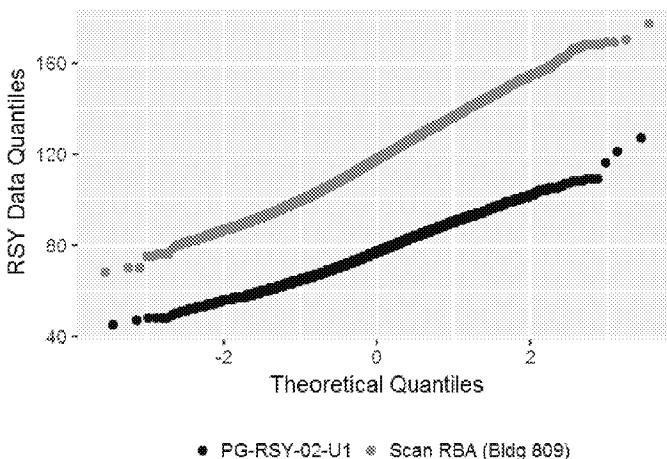
# Soil Scan Statistics

## Normal Q-Q Plots

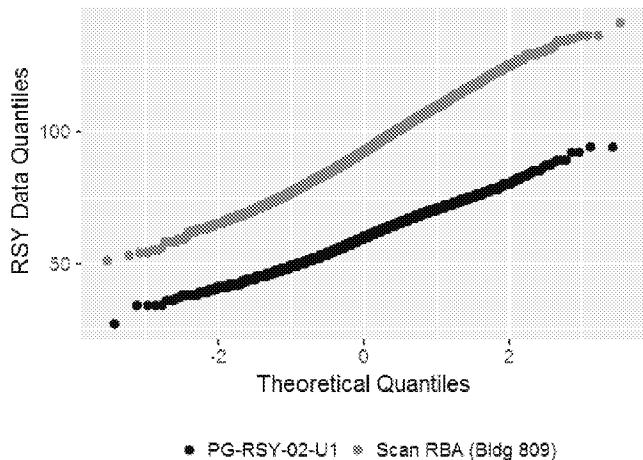
ROI 03



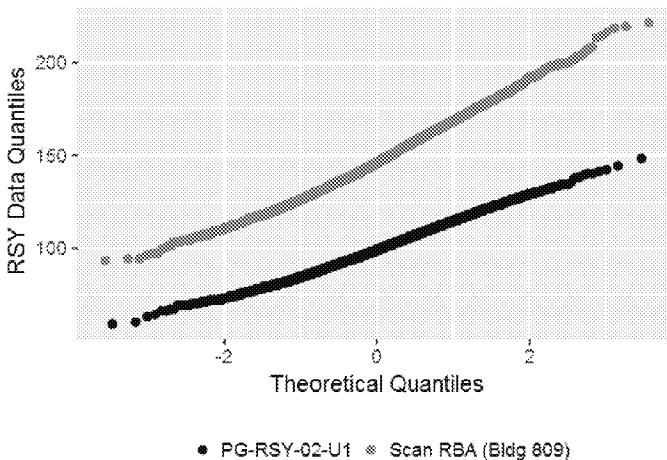
ROI 06



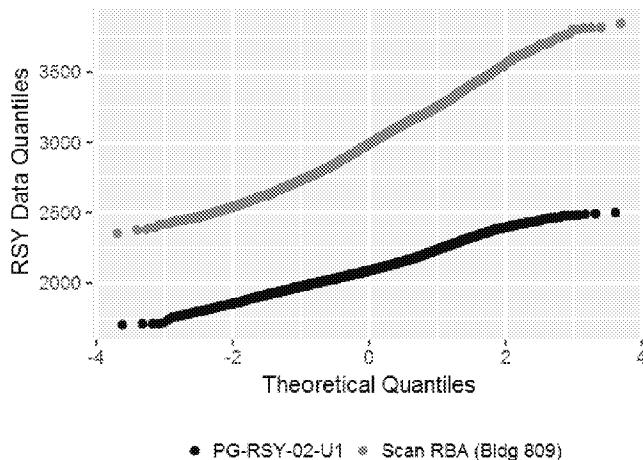
ROI 07



ROI 08

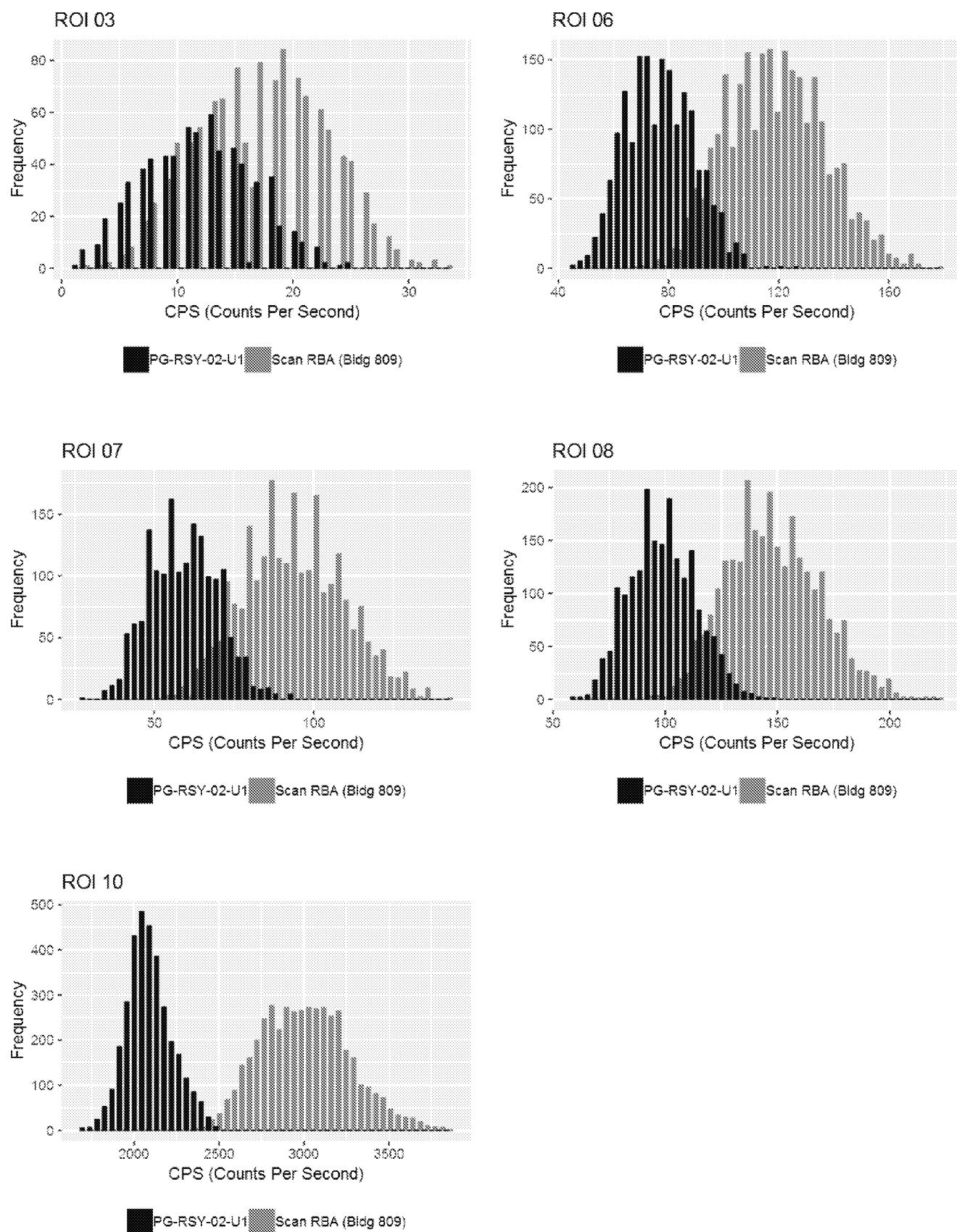


ROI 10



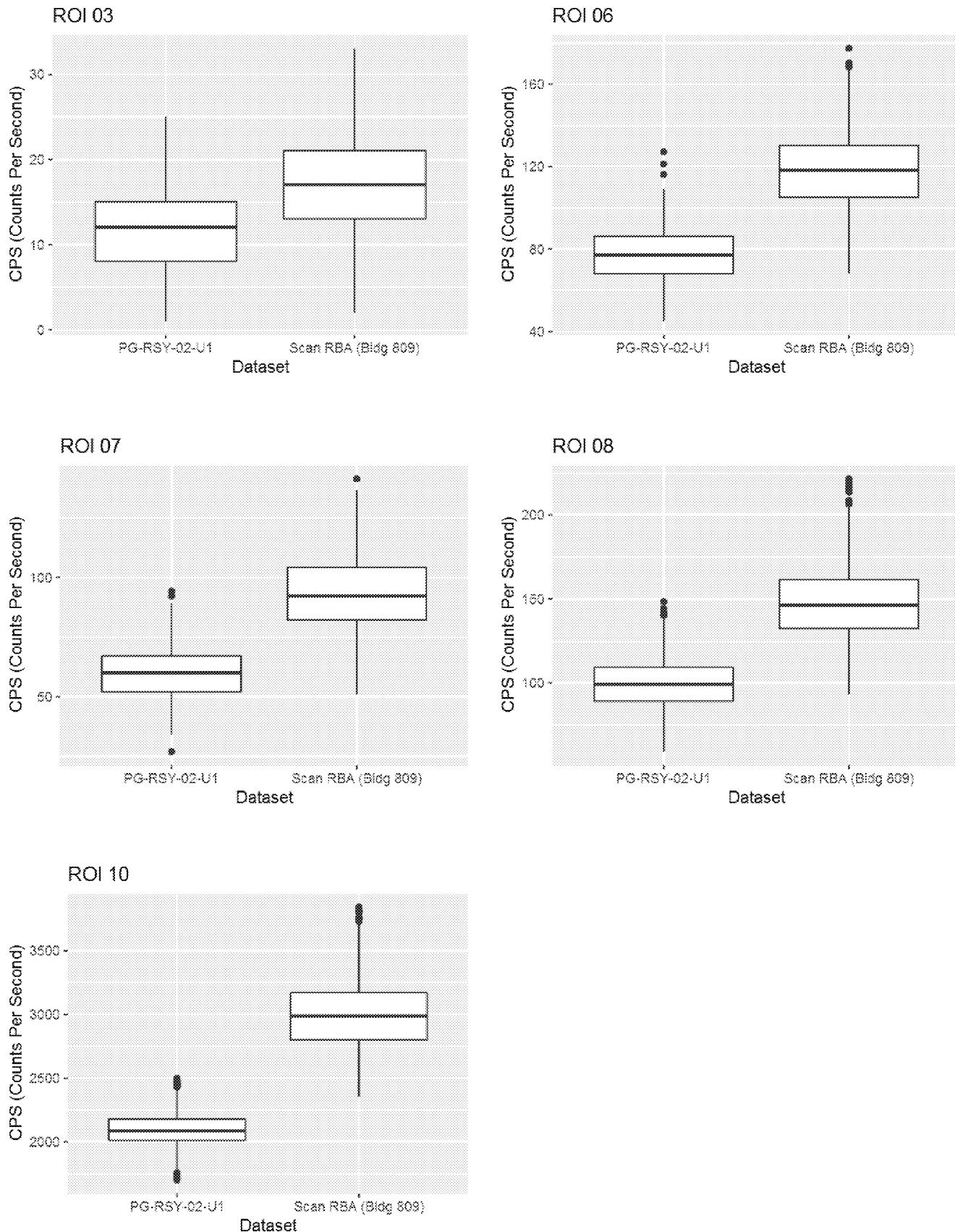
# Soil Scan Statistics

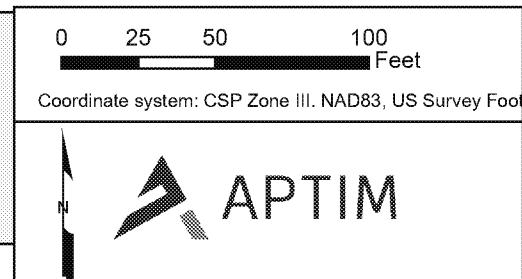
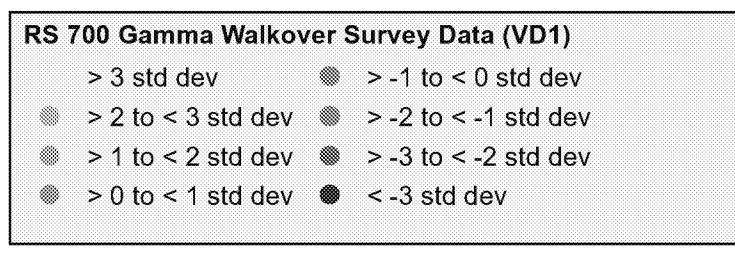
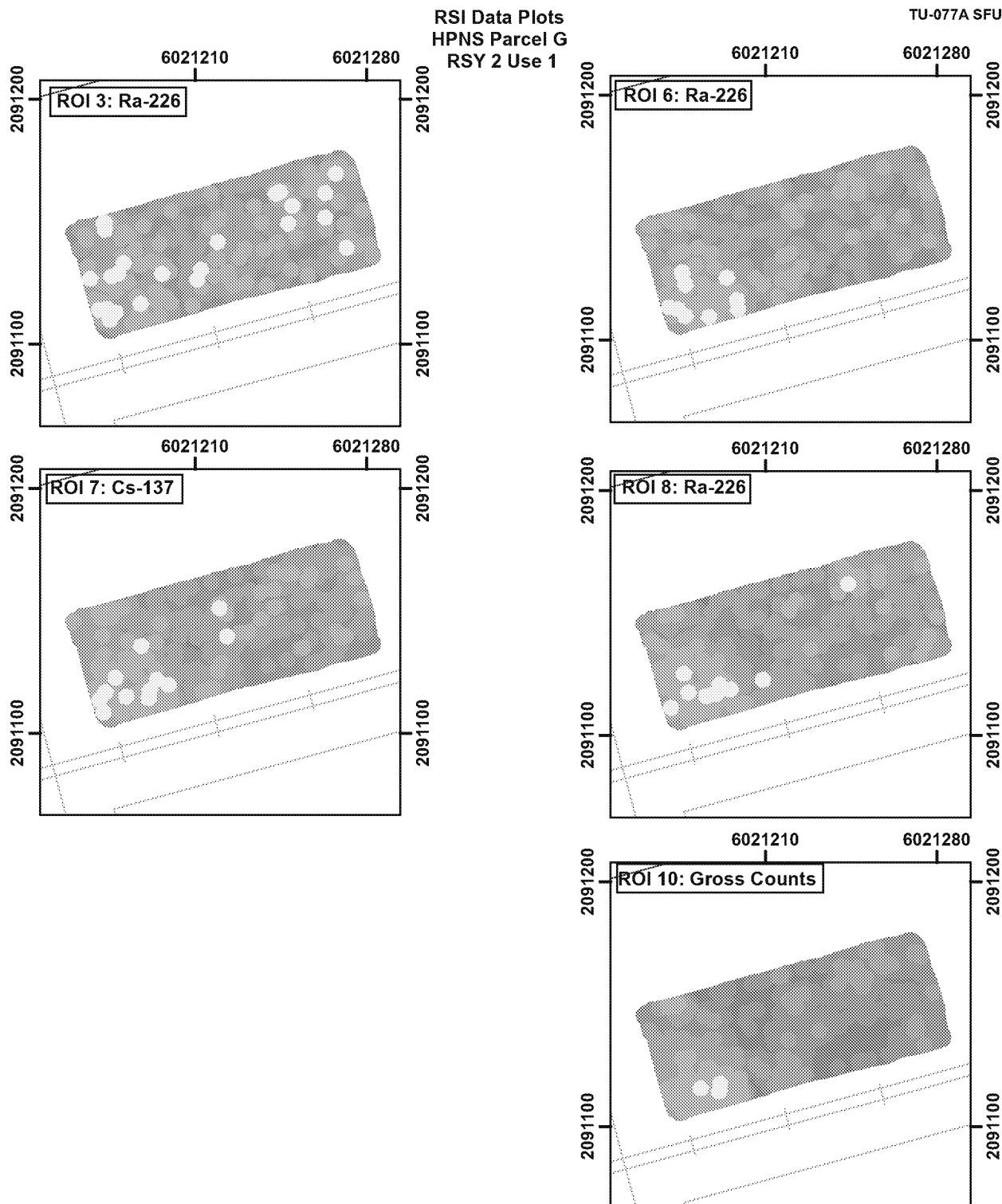
## Histograms

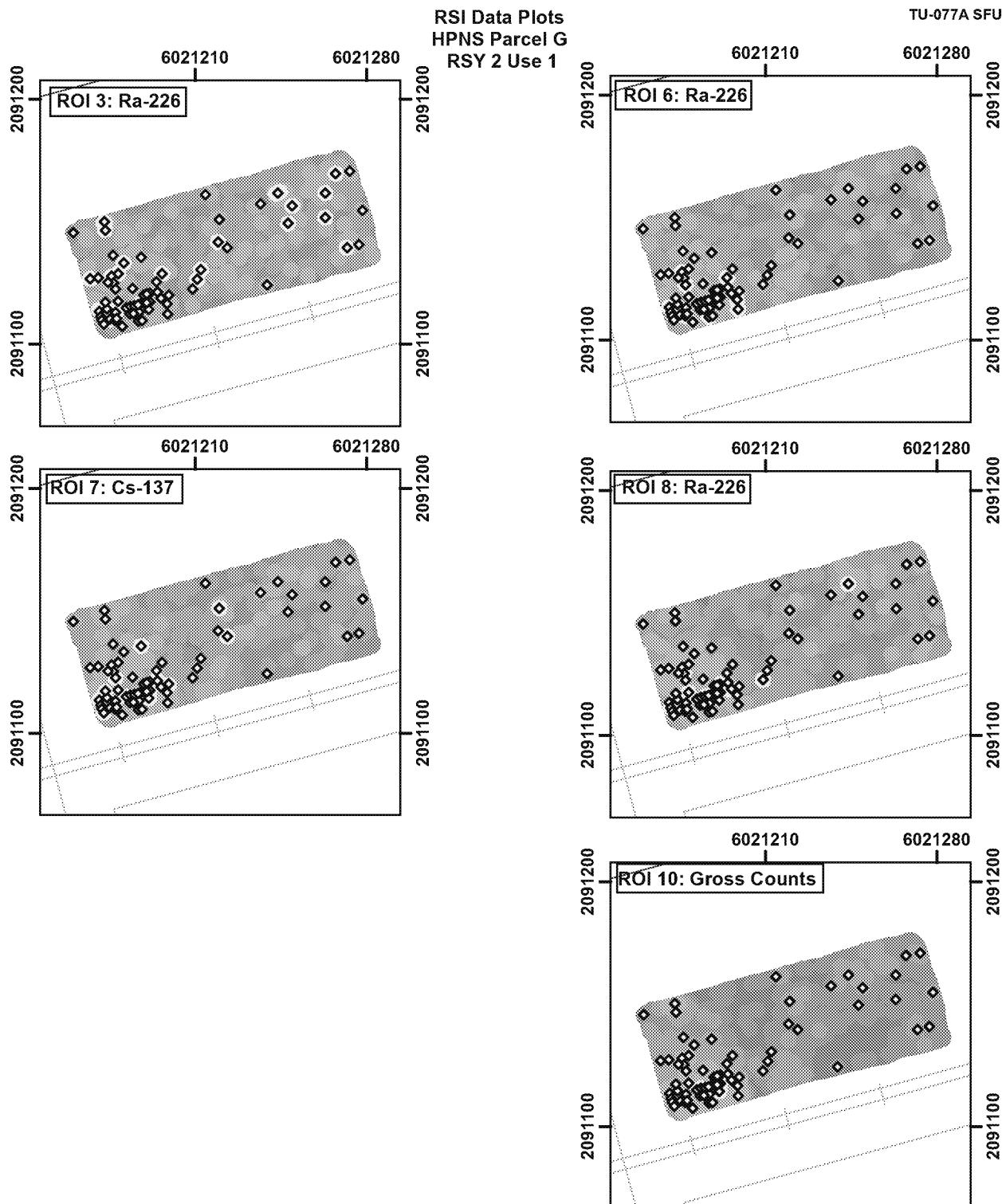


# Soil Scan Statistics

## Box Plots







#### RS 700 Gamma Walkover Survey Data (VD1)

- |                       |                        |
|-----------------------|------------------------|
| ◆ Follow-Up Locations | ● > -1 to < 0 std dev  |
| > 3 std dev           | ● > -2 to < -1 std dev |
| ● > 2 to < 3 std dev  | ● > -3 to < -2 std dev |
| ● > 1 to < 2 std dev  | ● < -3 std dev         |
| ● > 0 to < 1 std dev  |                        |

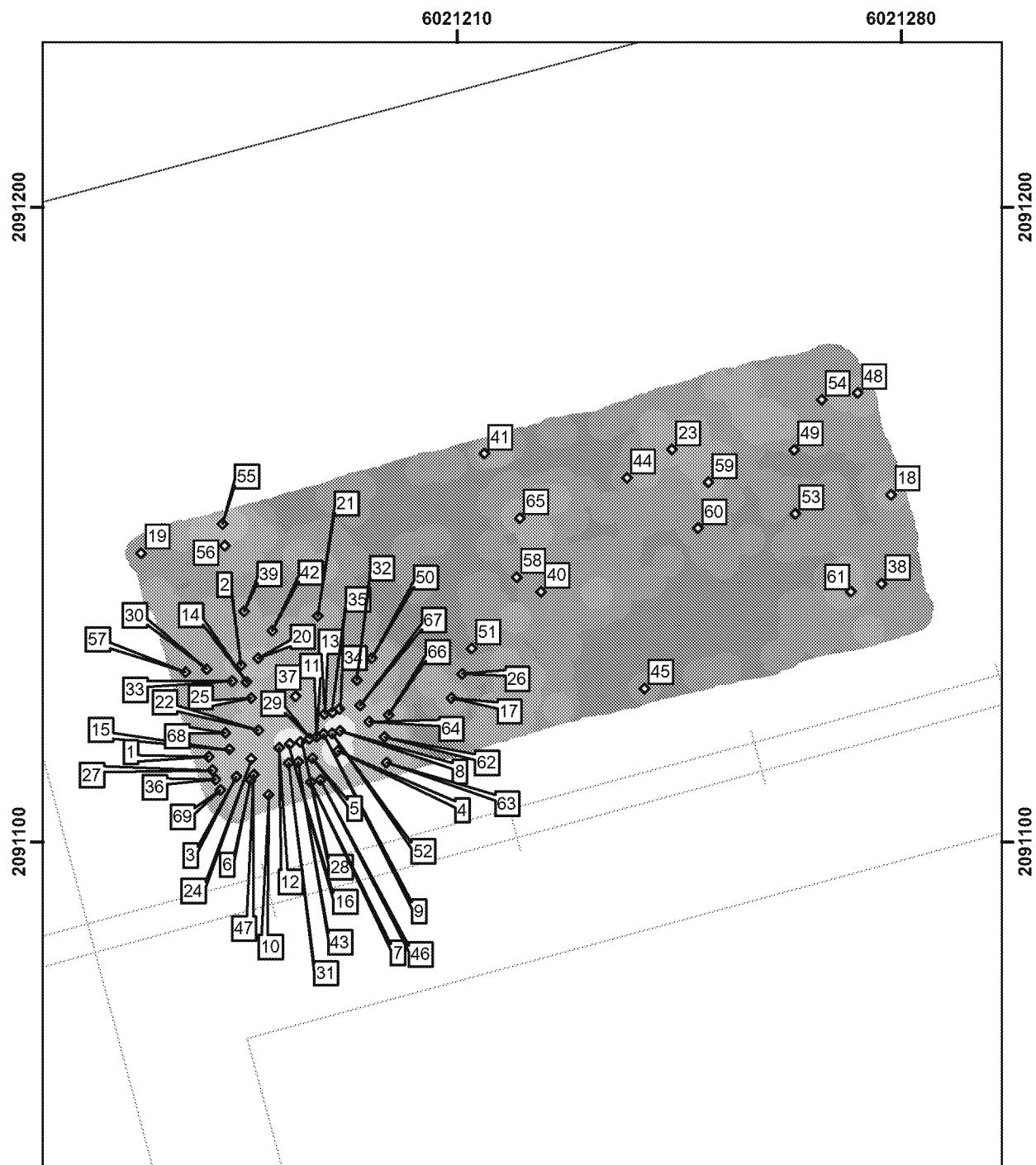
0 25 50 100 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



Follow-Up Static Survey  
HPNS Parcel G  
RSY 2 Use 1

TU-077A SFU



RSY 2 Use 1 (VD1, ROI 10 Gross Gamma)

- ◆ Follow-Up Locations
  - > 1 to < 2 std dev
  - > -2 to < -1 std dev
  - > 3 std dev
  - > 0 to < 1 std dev
  - > -3 to < -2 std dev
  - > 2 to < 3 std dev
  - > -1 to < 0 std dev
  - < -3 std dev

0 5 10 20 30 40  
Feet

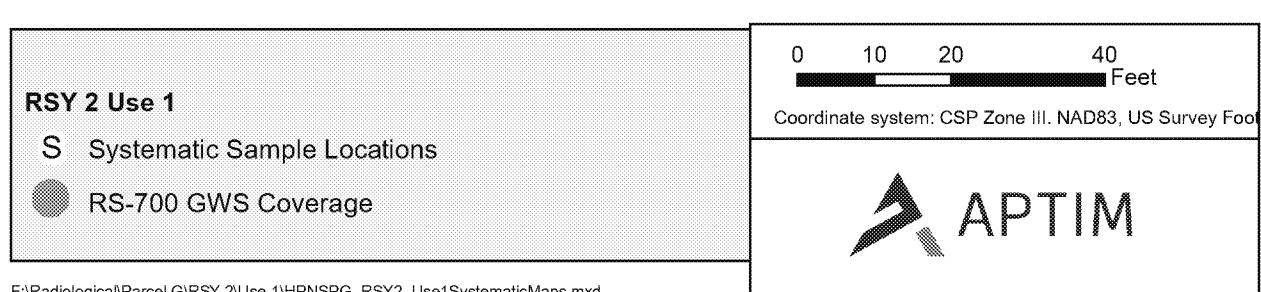
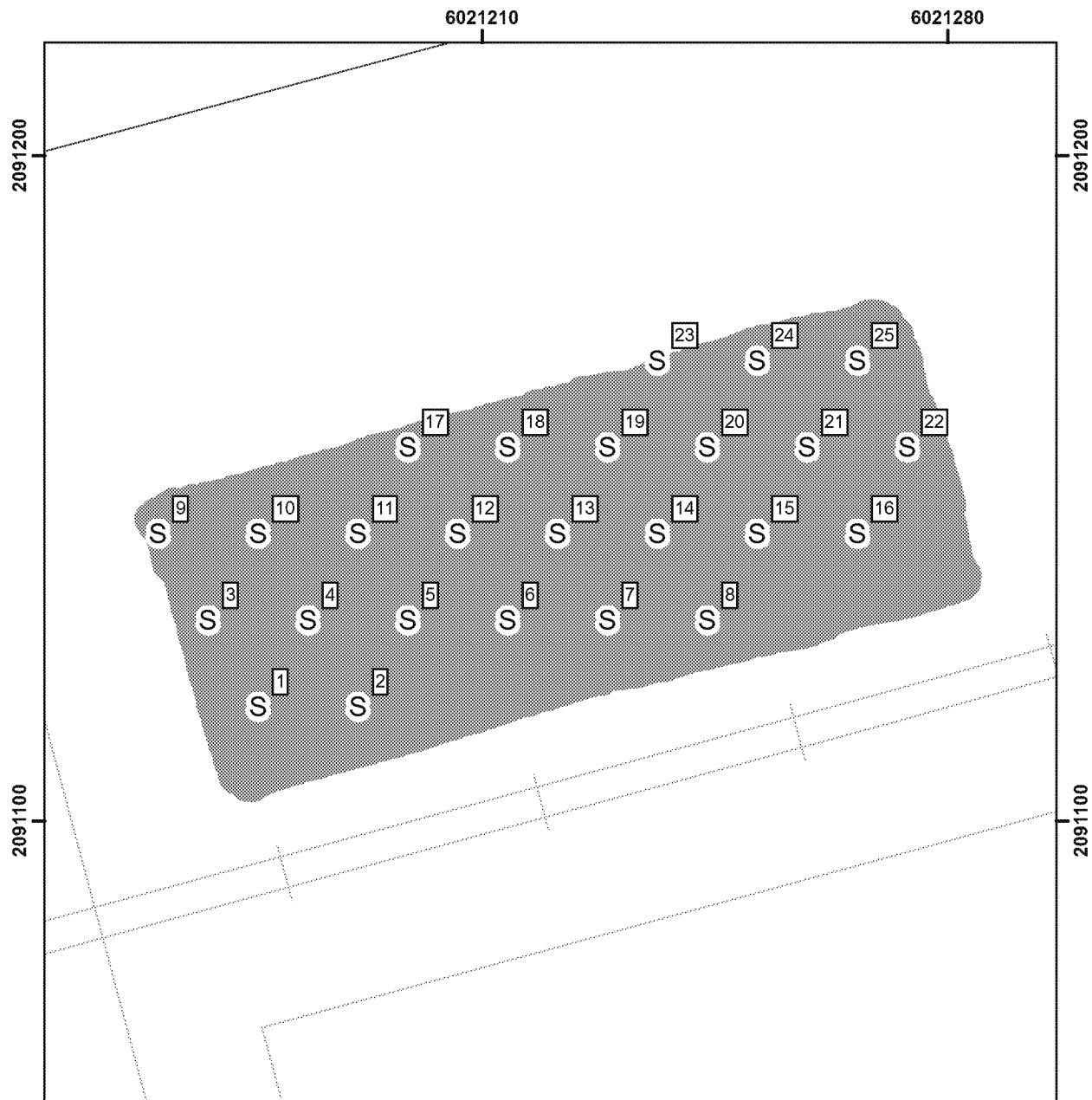
Coordinate system: CSP Zone III, NAD83, US Survey Foot



APTIM

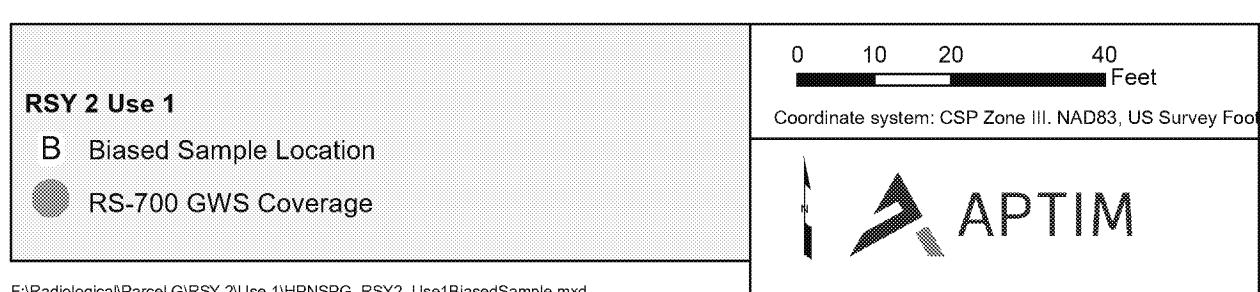
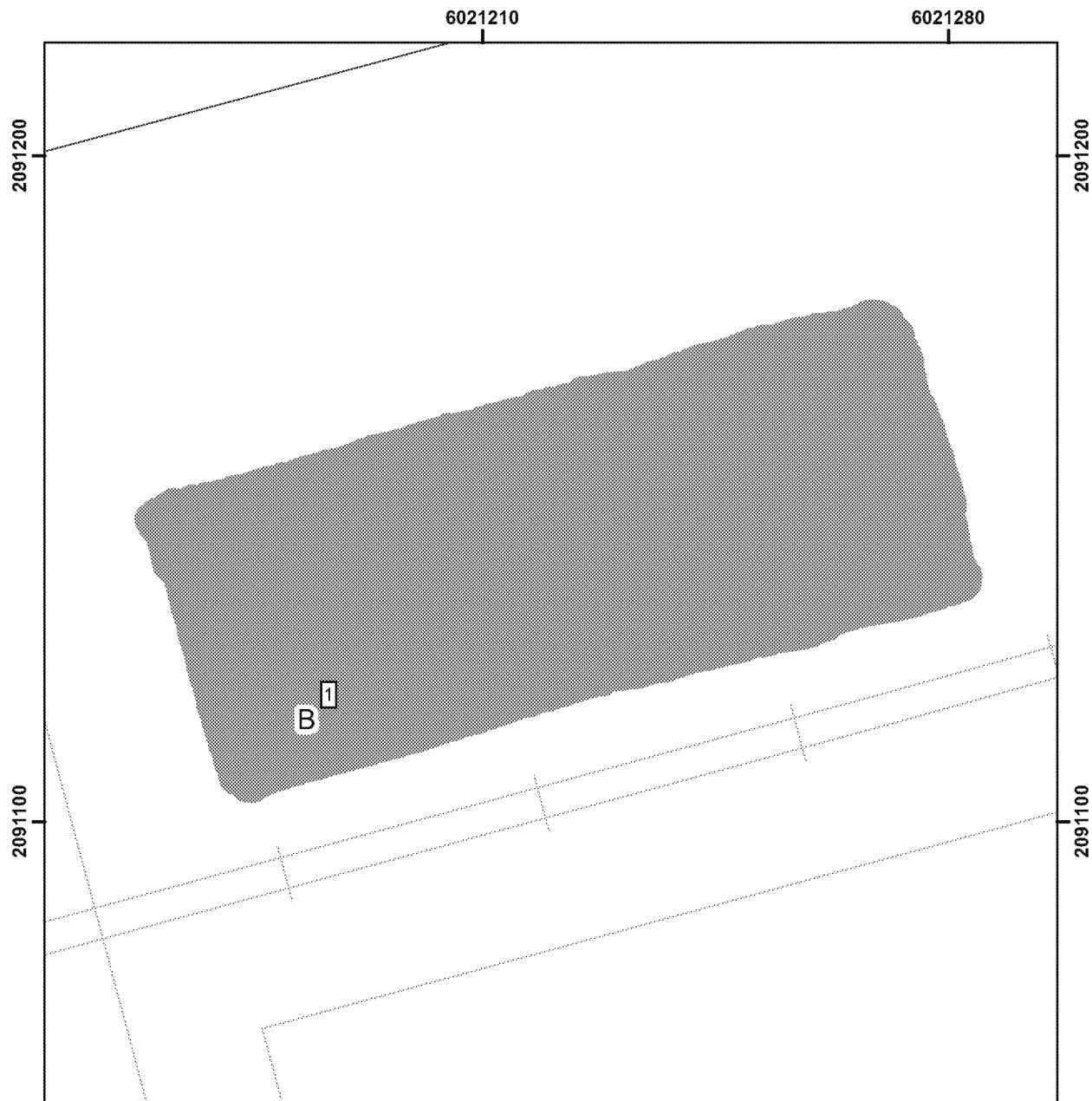
**Systematic Sampling  
HPNS Parcel G  
RSY 2 Use 1**

TU-077A SFU

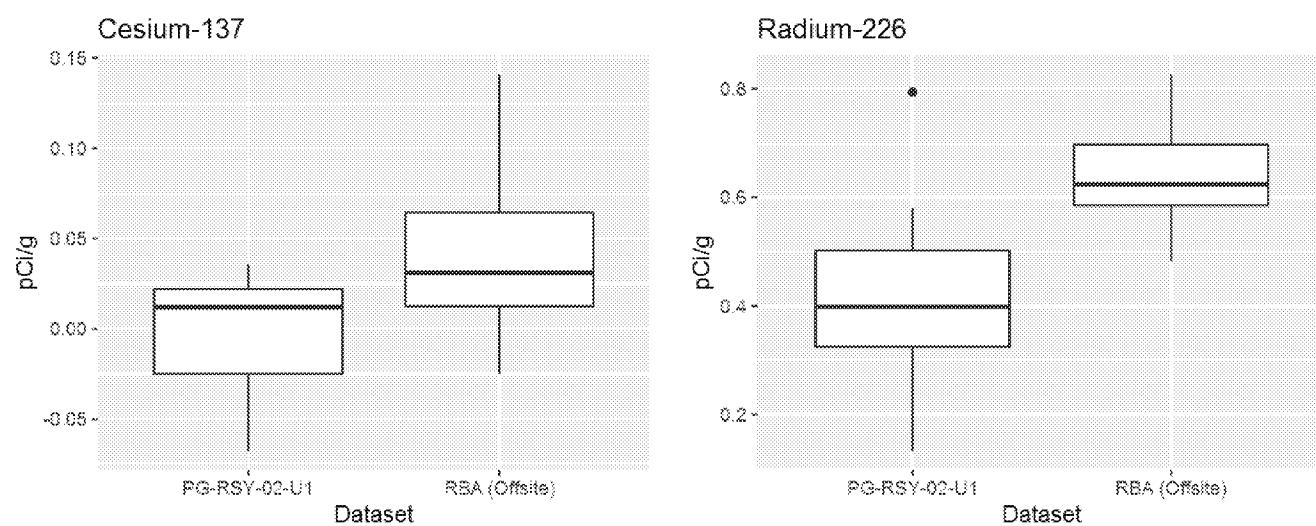
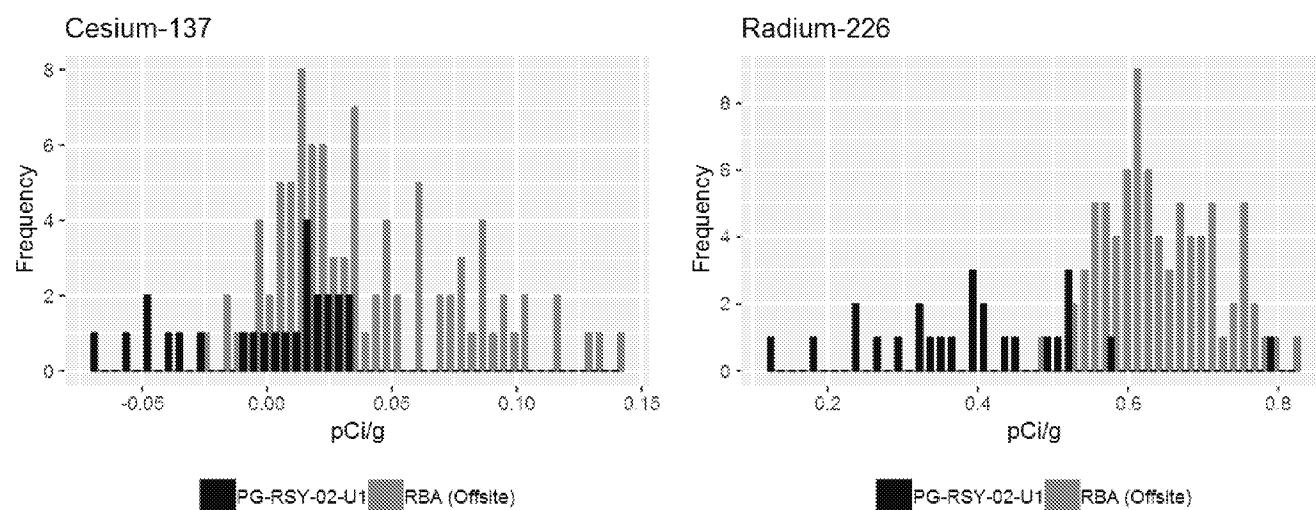
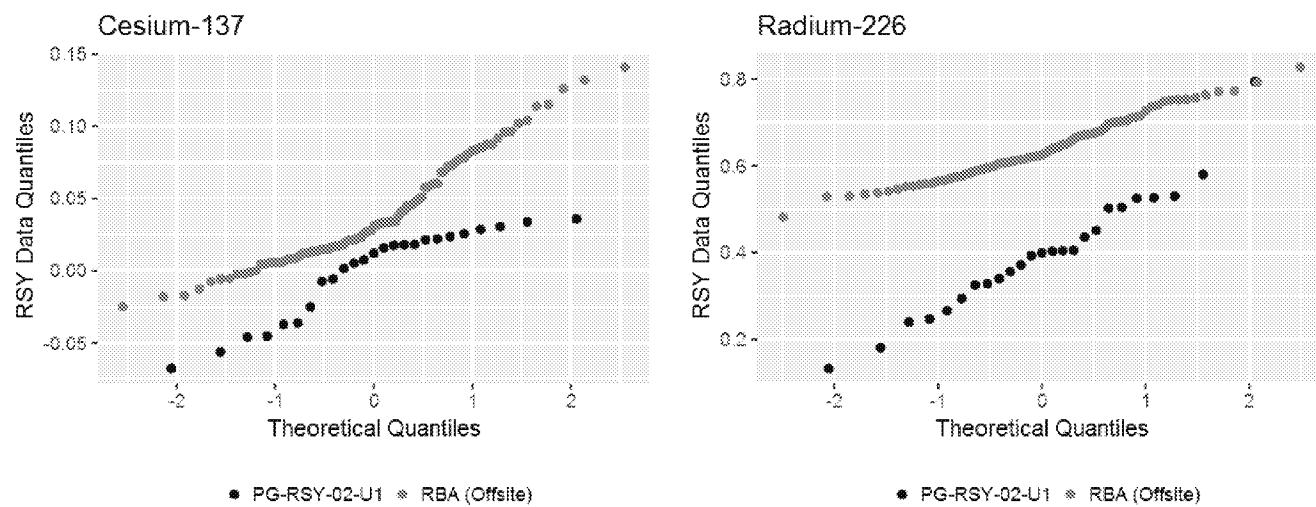


**Biased Sampling  
HPNS Parcel G  
RSY 2 Use 1**

TU-077A SFU

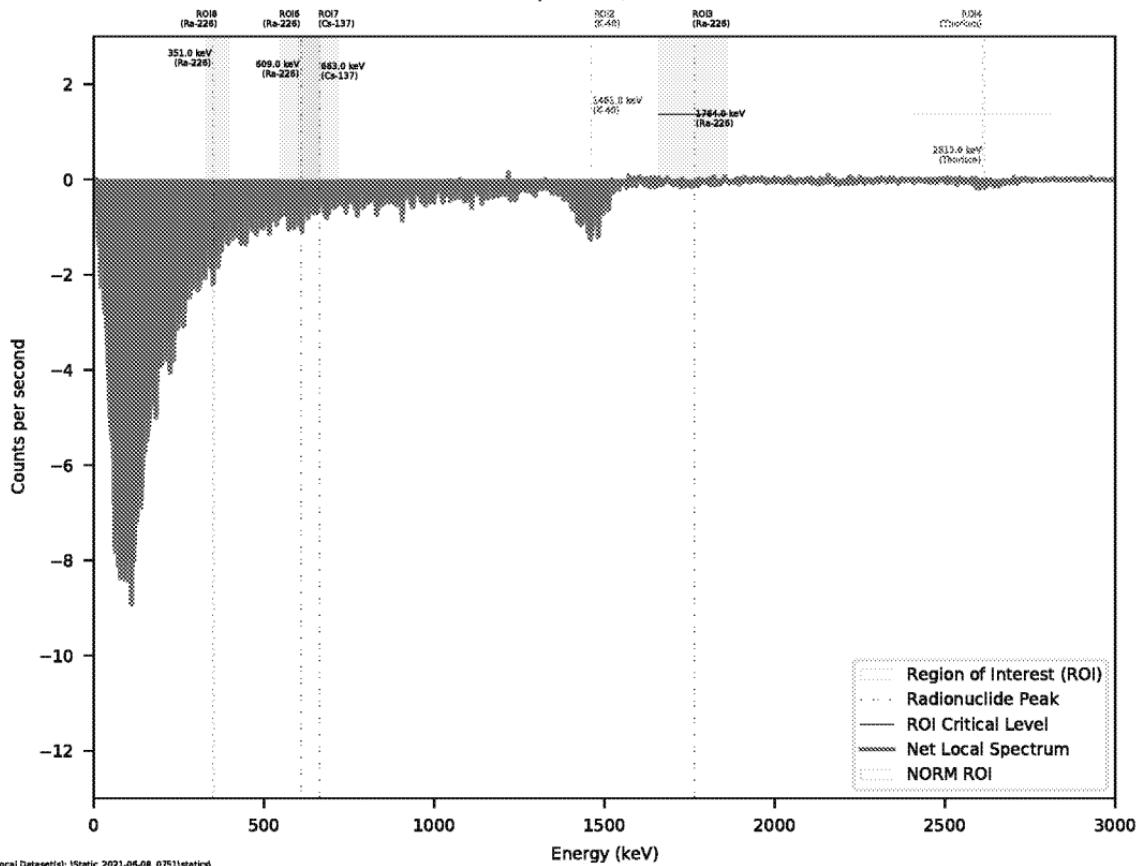


## Soil Sample Statistics





# Net Gamma Spectrum, Static Location: 1

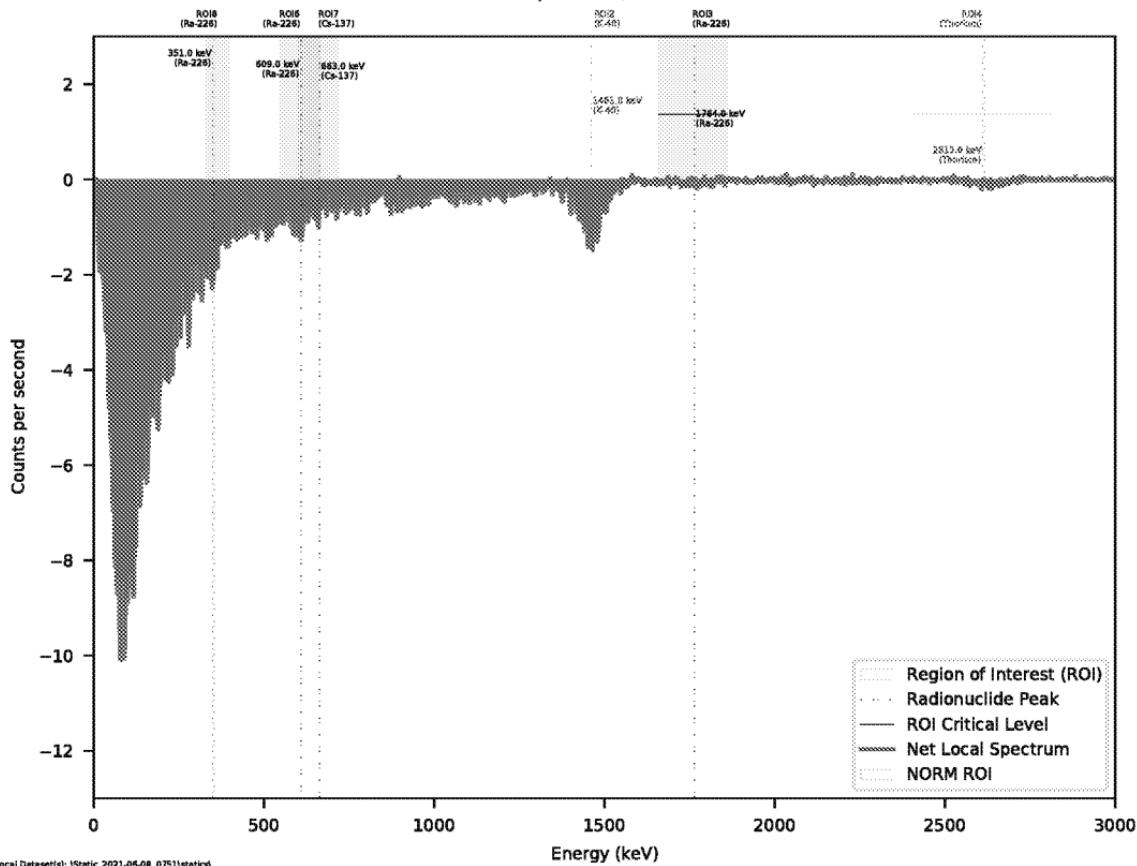


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

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ED\_006360A\_00000162-00014

## Net Gamma Spectrum, Static Location: 2

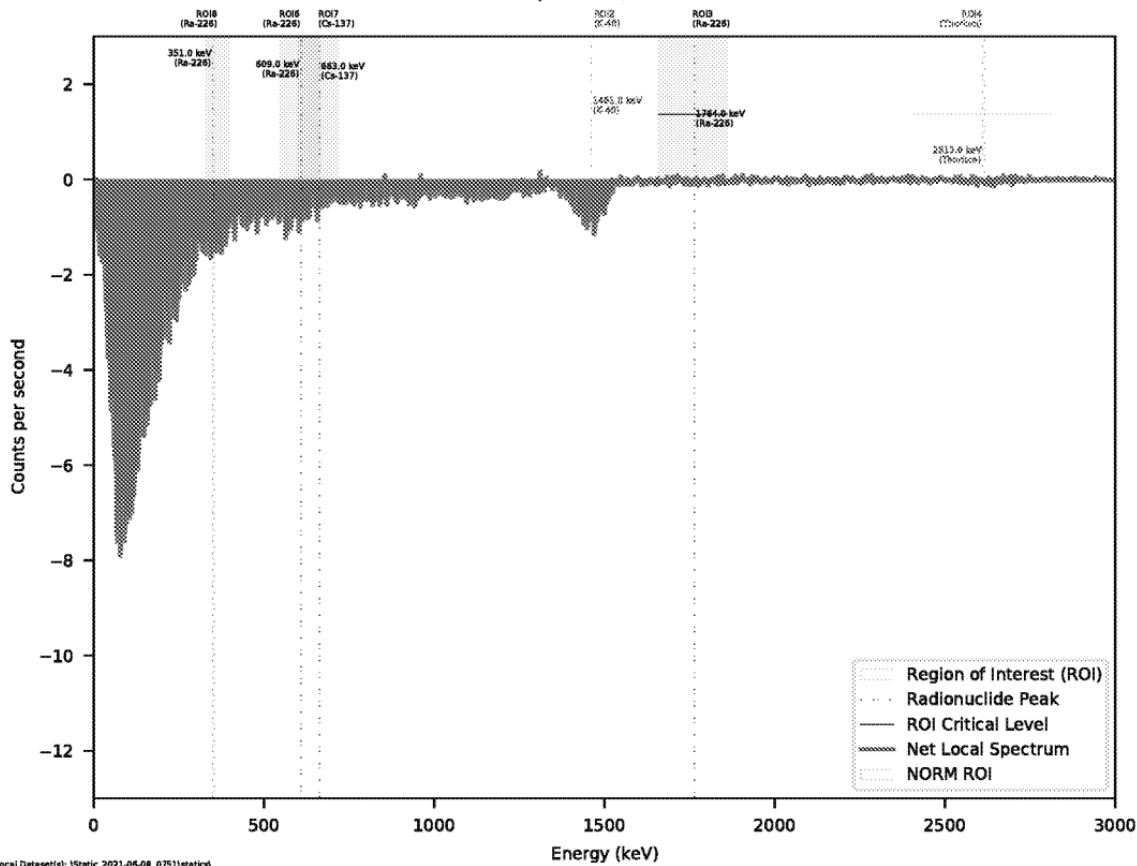


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ED\_006360A\_00000162-00015

### Net Gamma Spectrum, Static Location: 3

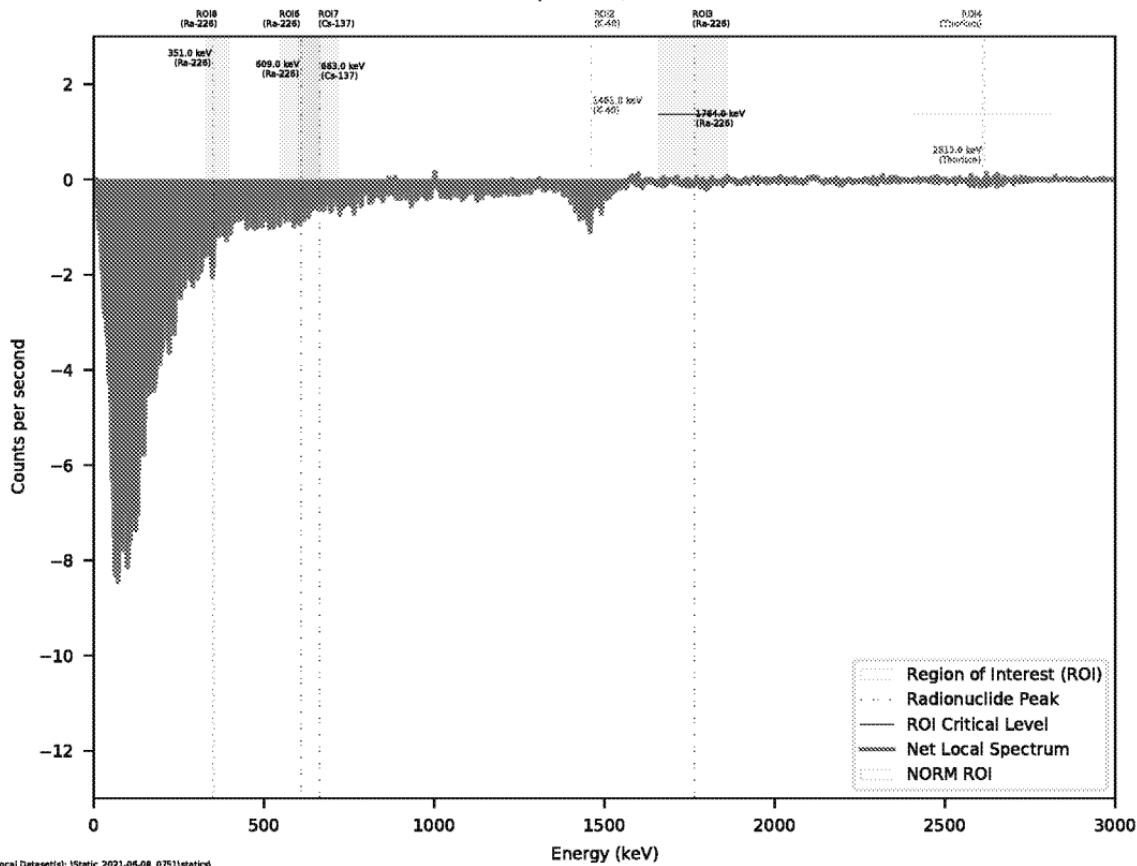


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ED\_006360A\_00000162-00016

### Net Gamma Spectrum, Static Location: 4

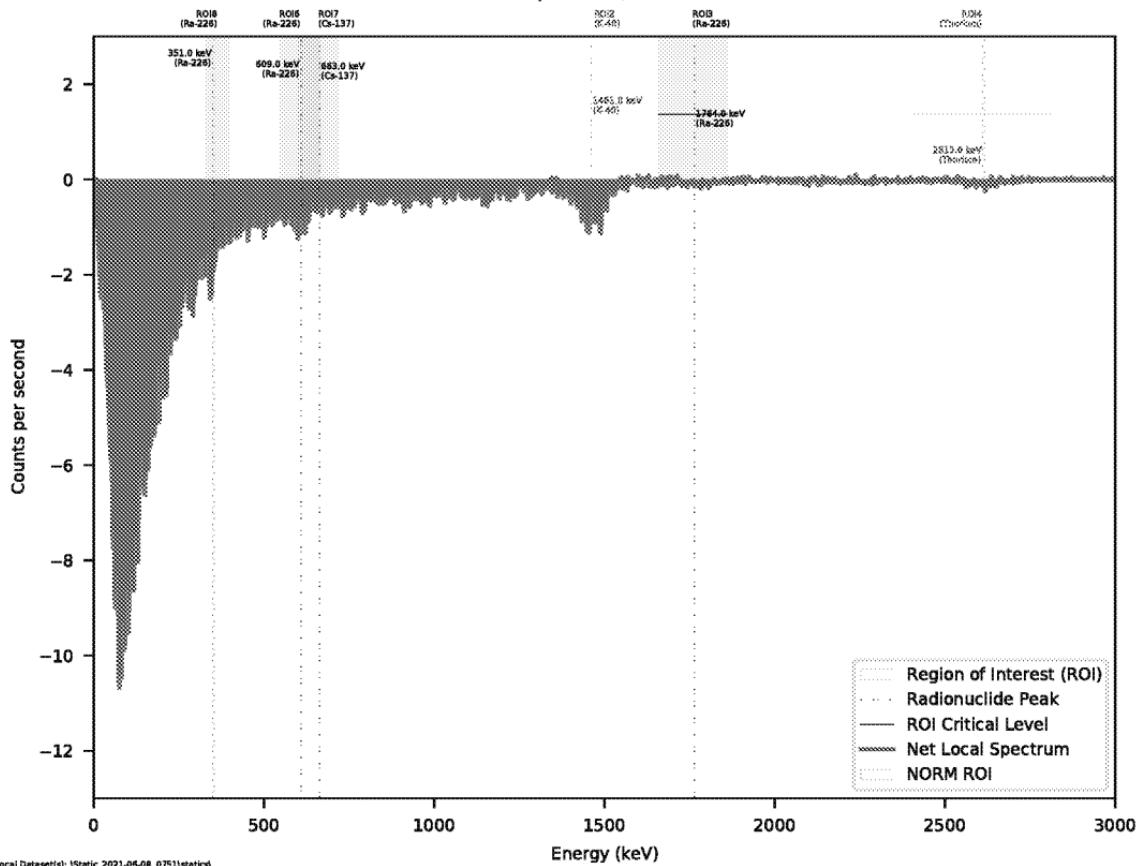


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Background Dataset(s): RSII\_SoilRBA\_Static.csv

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ED\_006360A\_00000162-00017

### Net Gamma Spectrum, Static Location: 5

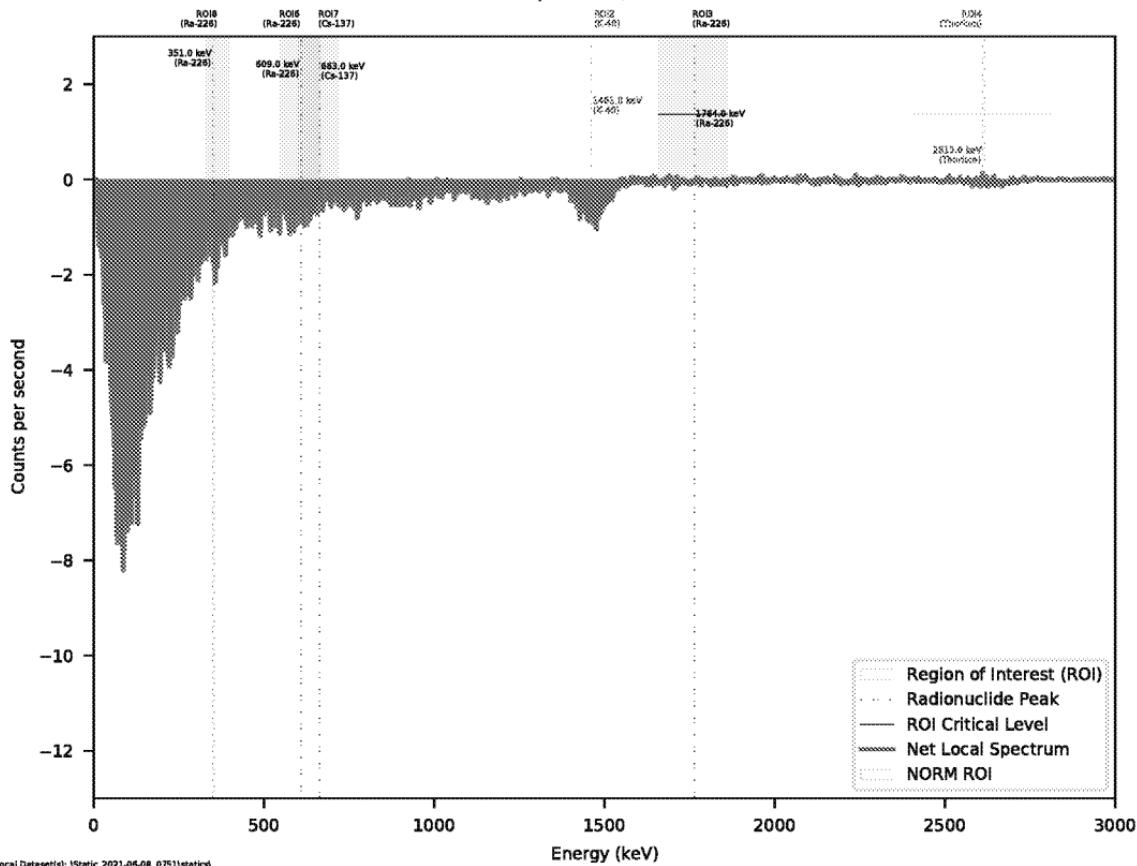


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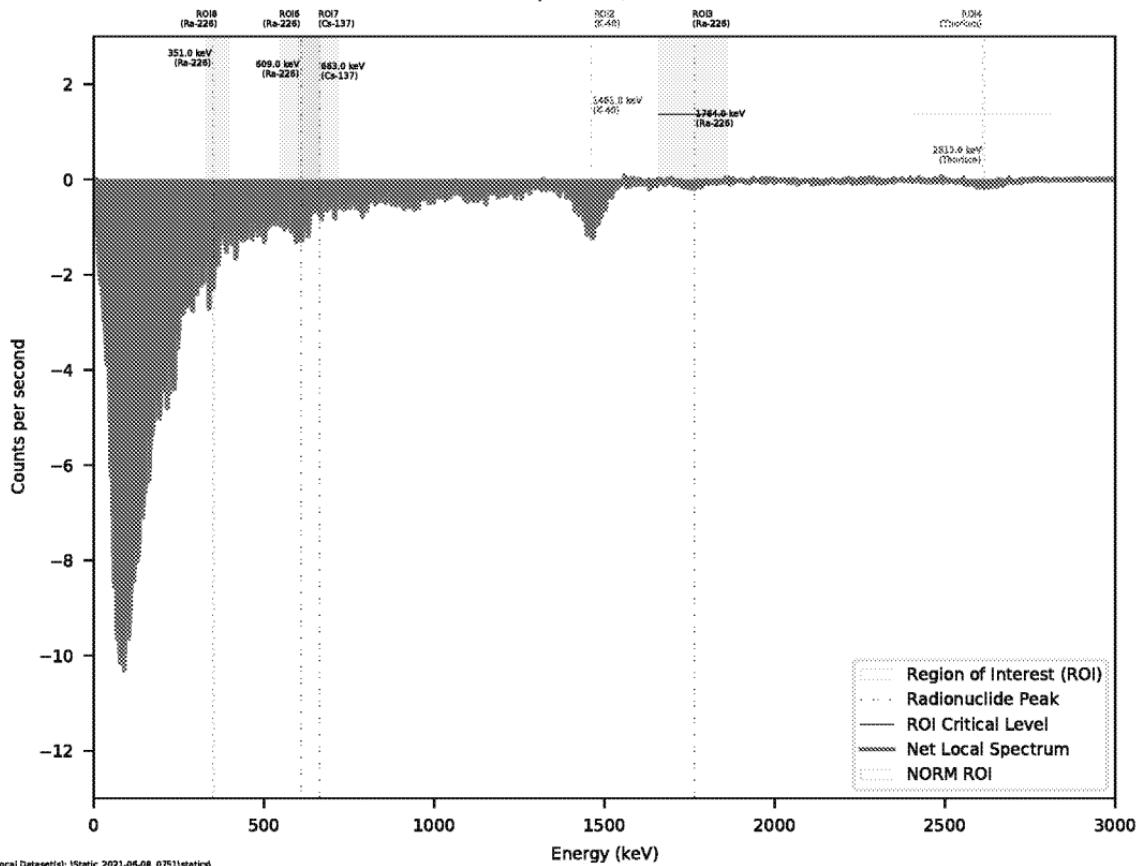
ED\_006360A\_00000162-00018

## Net Gamma Spectrum, Static Location: 6



ED\_006360A\_00000162-00019

### Net Gamma Spectrum, Static Location: 7

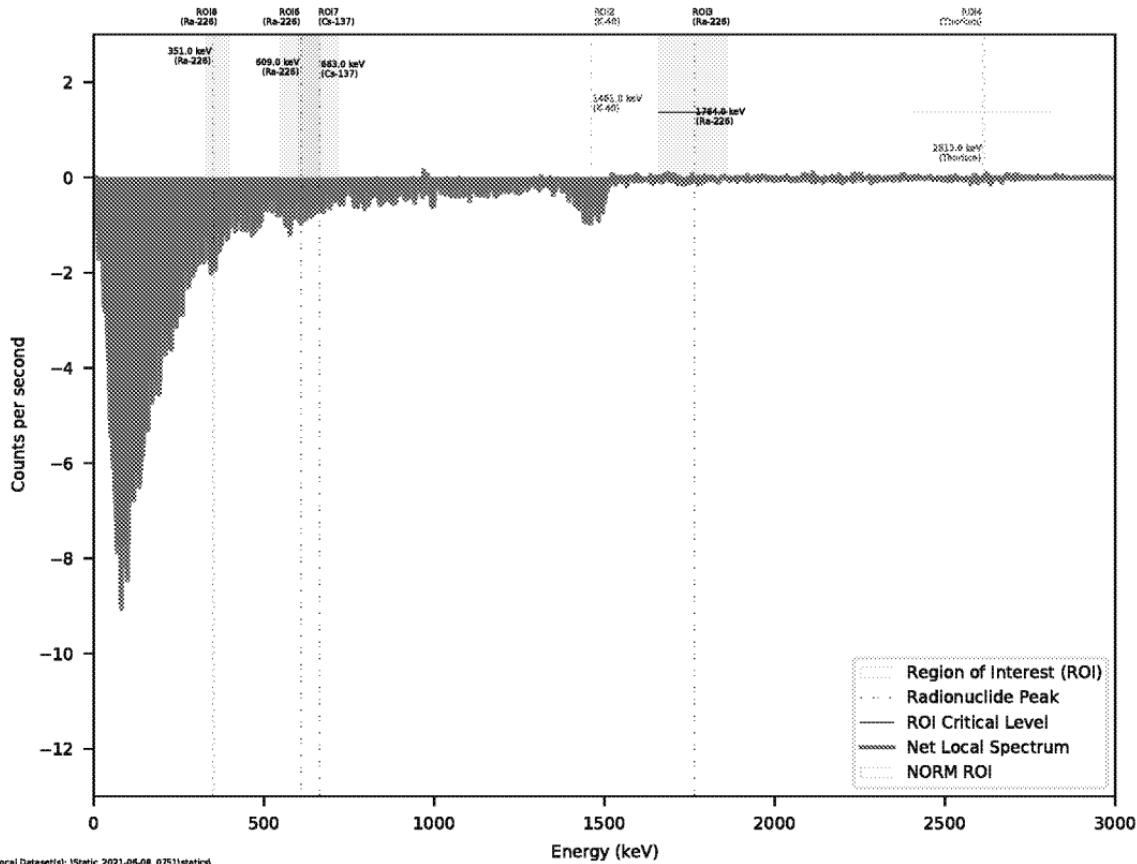


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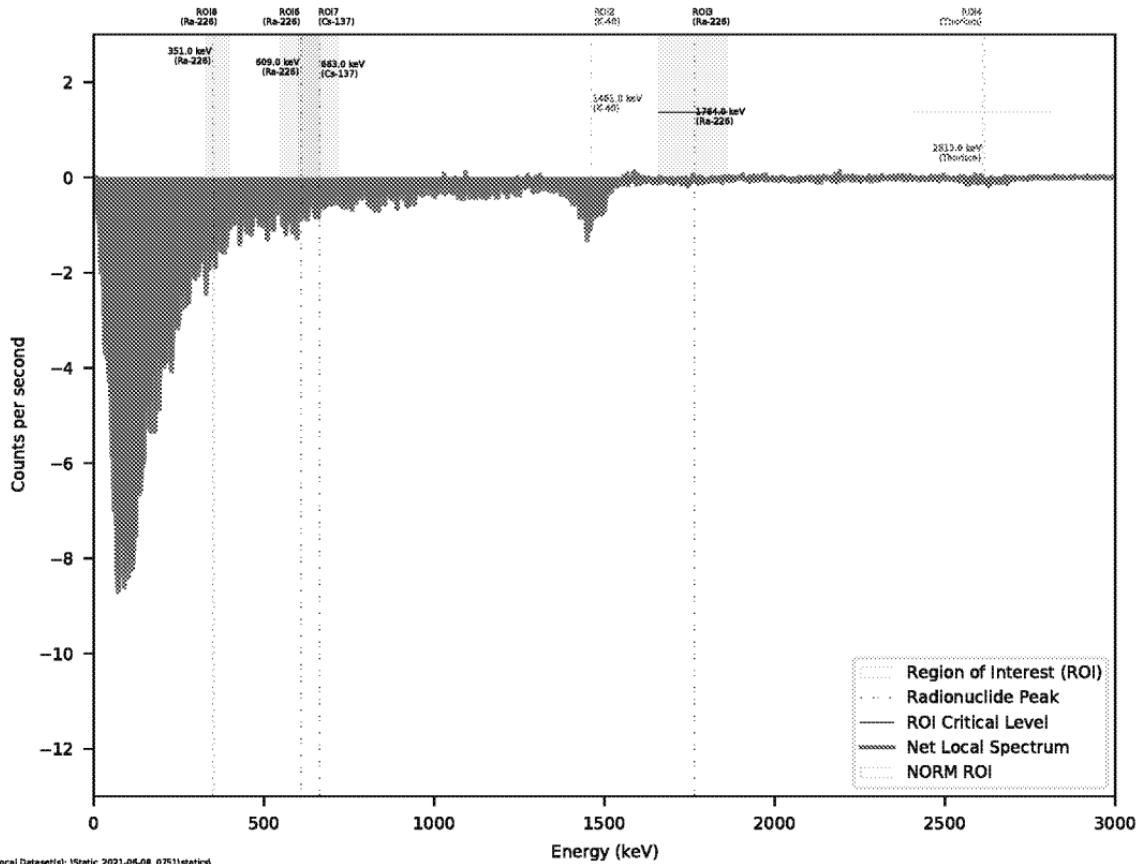
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### Net Gamma Spectrum, Static Location: 8



ED\_006360A\_00000162-00021

### Net Gamma Spectrum, Static Location: 9

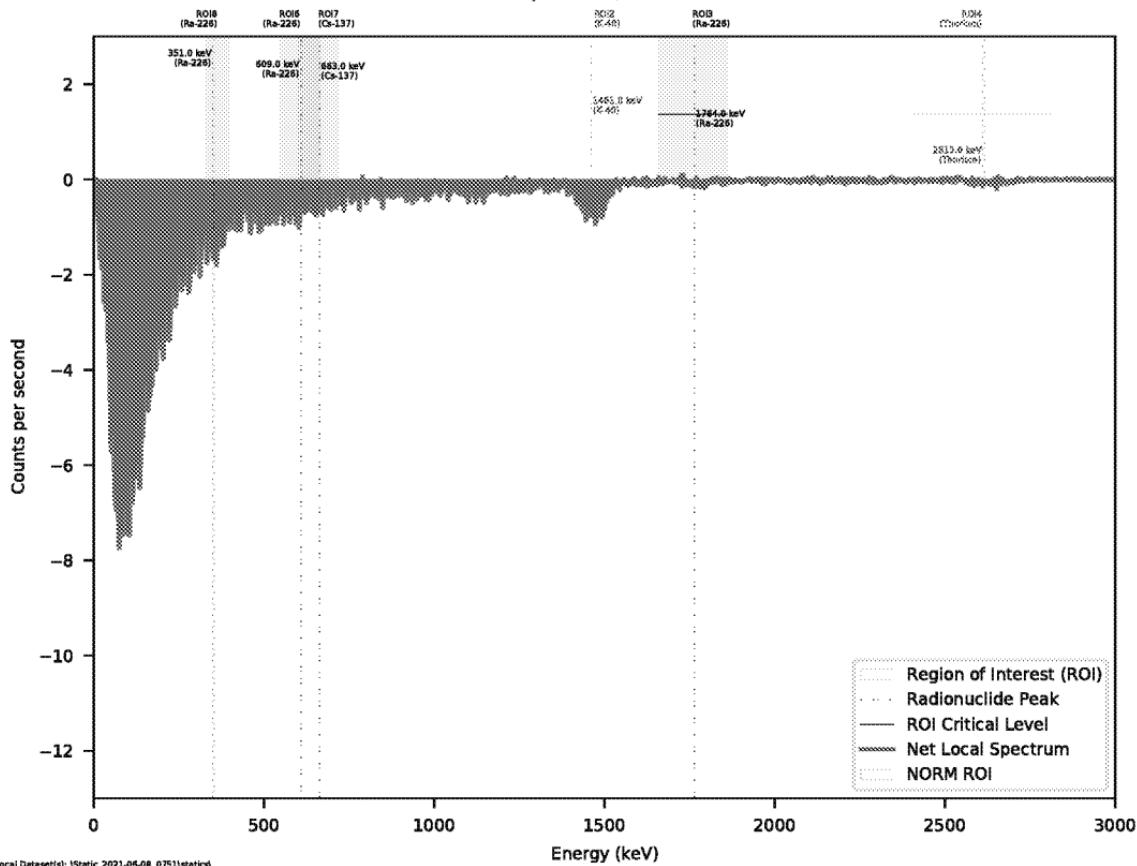


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ED\_006360A\_00000162-00022

### Net Gamma Spectrum, Static Location: 10

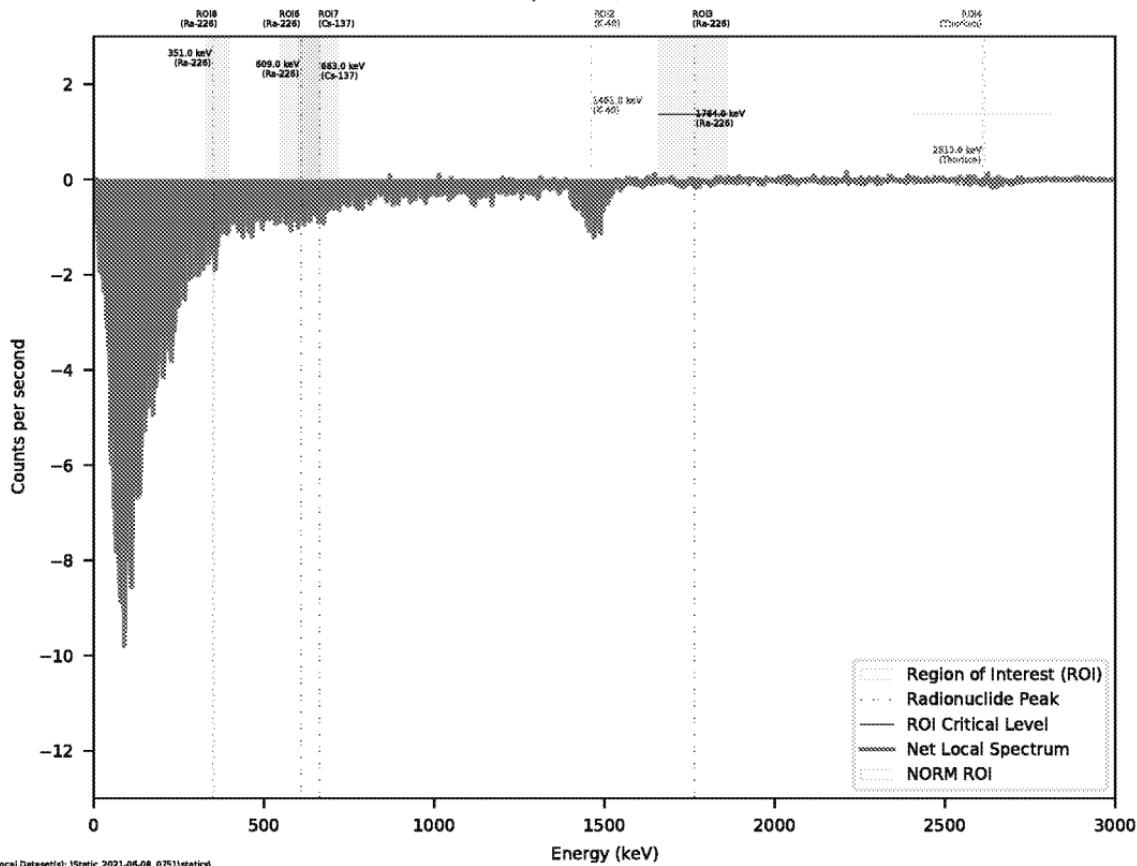


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ED\_006360A\_00000162-00023

# Net Gamma Spectrum, Static Location: 11

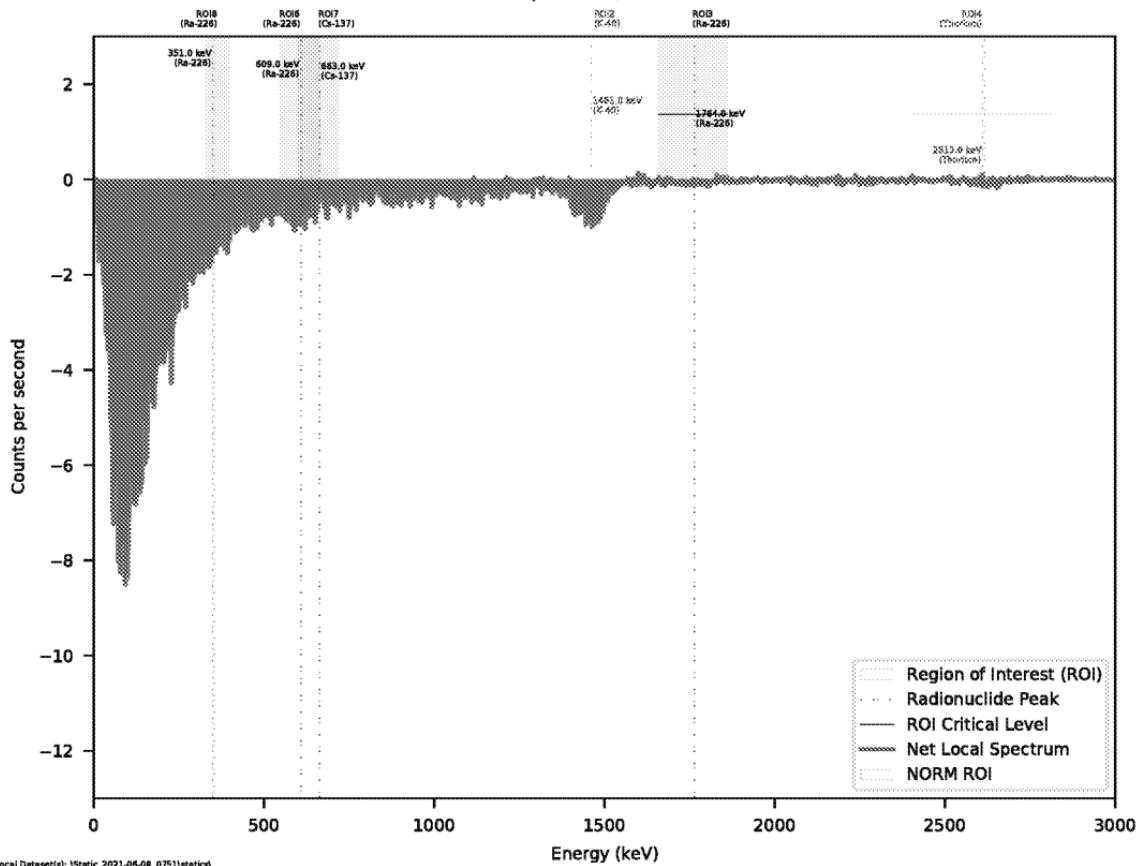


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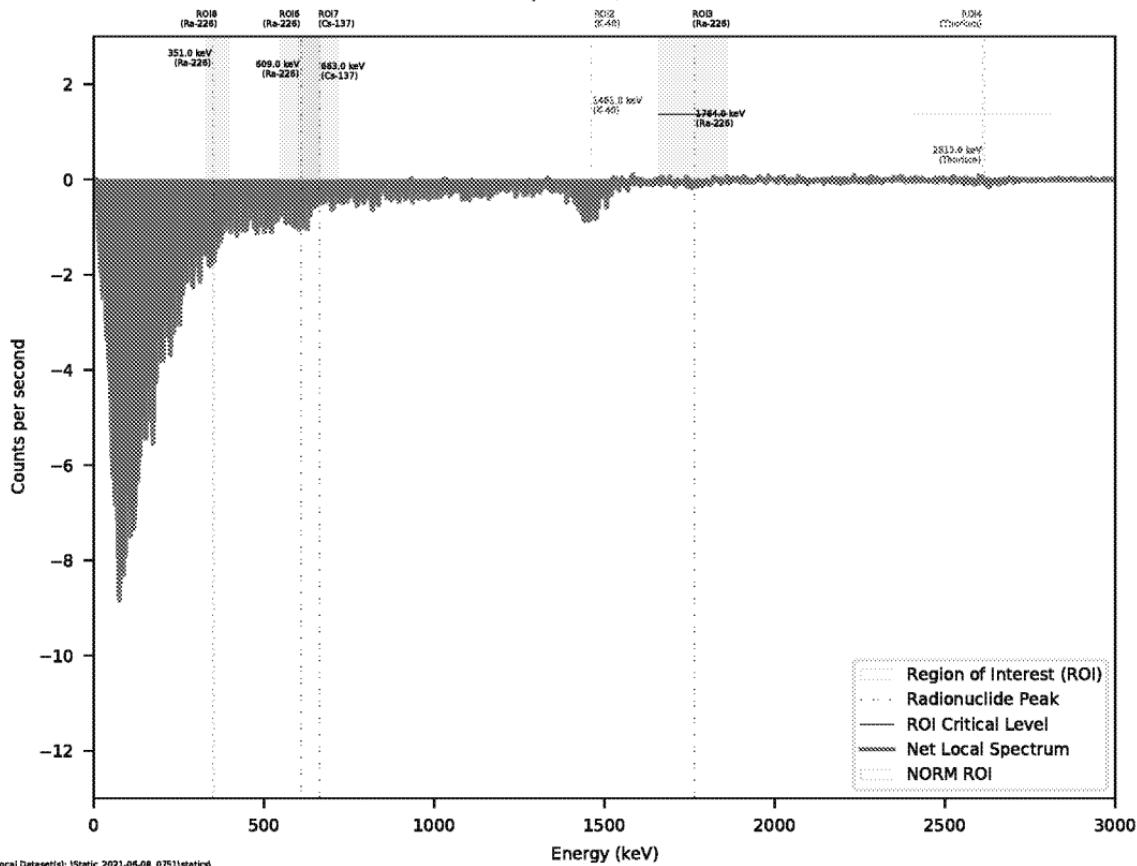
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## Net Gamma Spectrum, Static Location: 12



ED\_006360A\_00000162-00025

# Net Gamma Spectrum, Static Location: 13

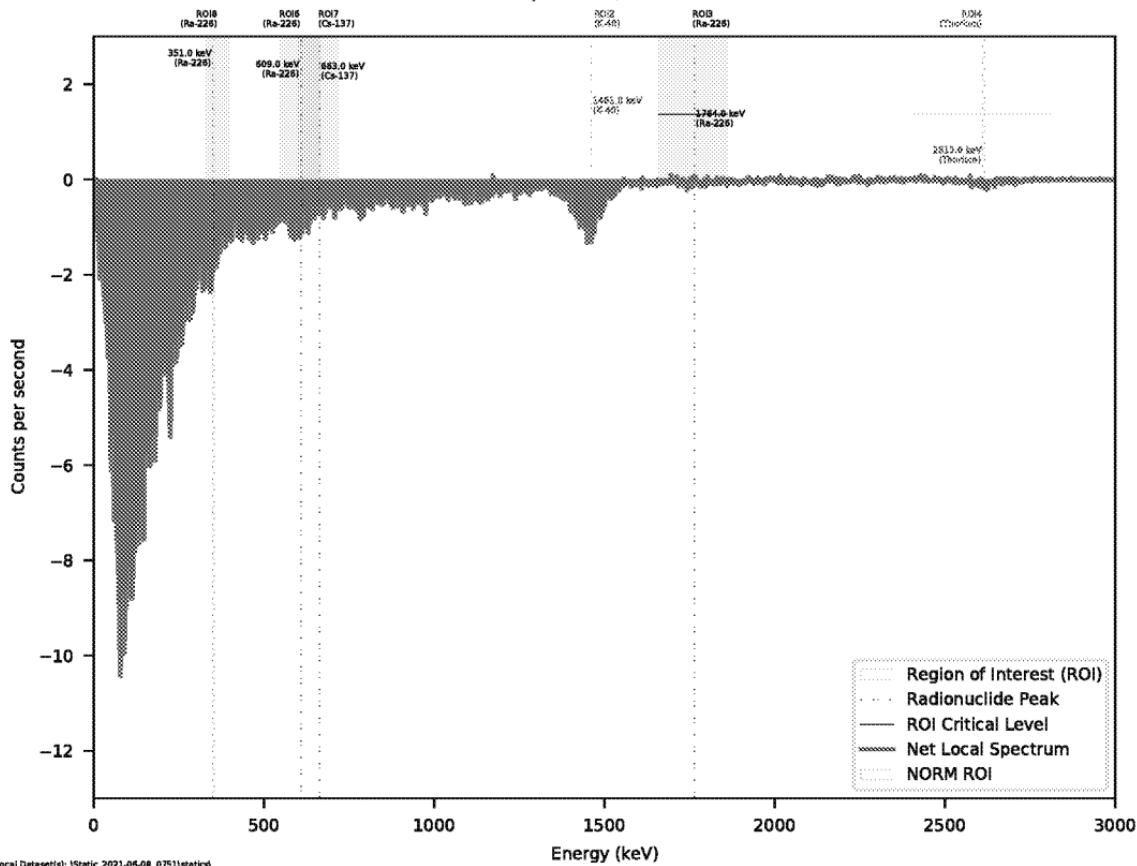


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ED\_006360A\_00000162-00026

# Net Gamma Spectrum, Static Location: 14

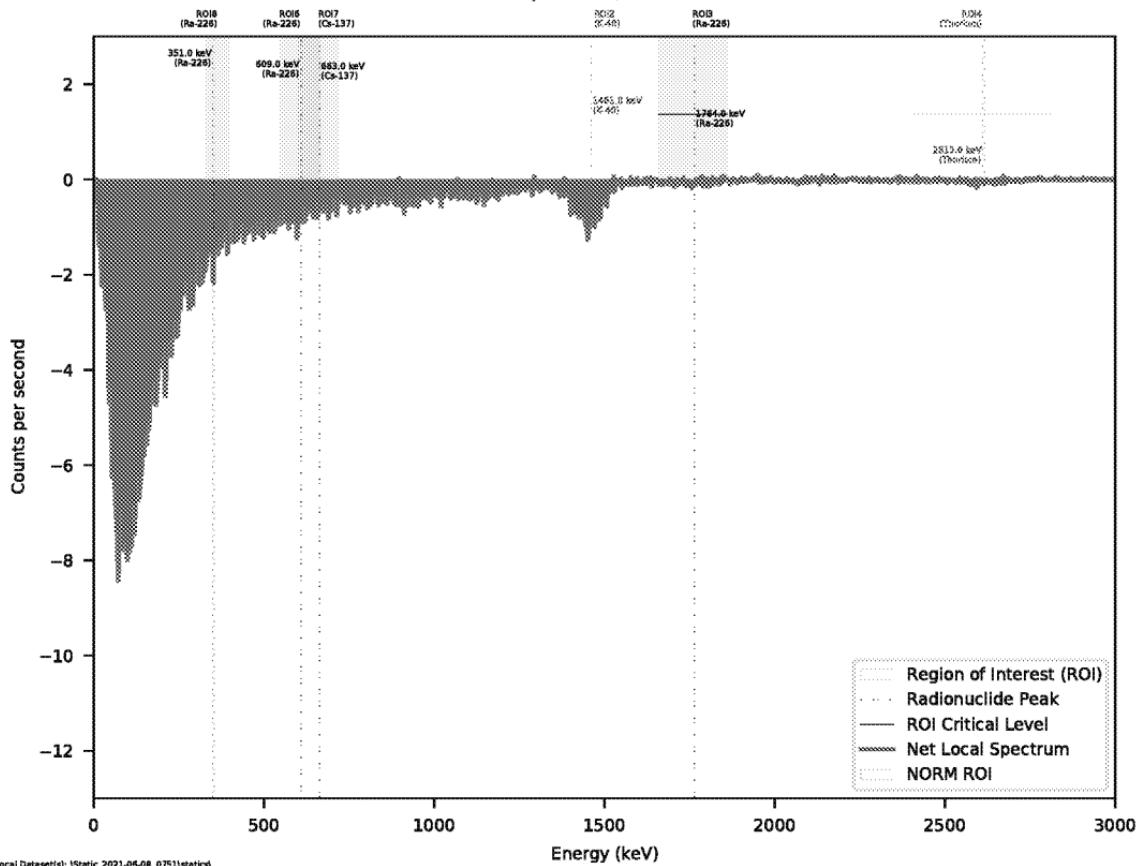


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Background Dataset(s): RSII\_SoilRBA\_Static.csv

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ED\_006360A\_00000162-00027

# Net Gamma Spectrum, Static Location: 15

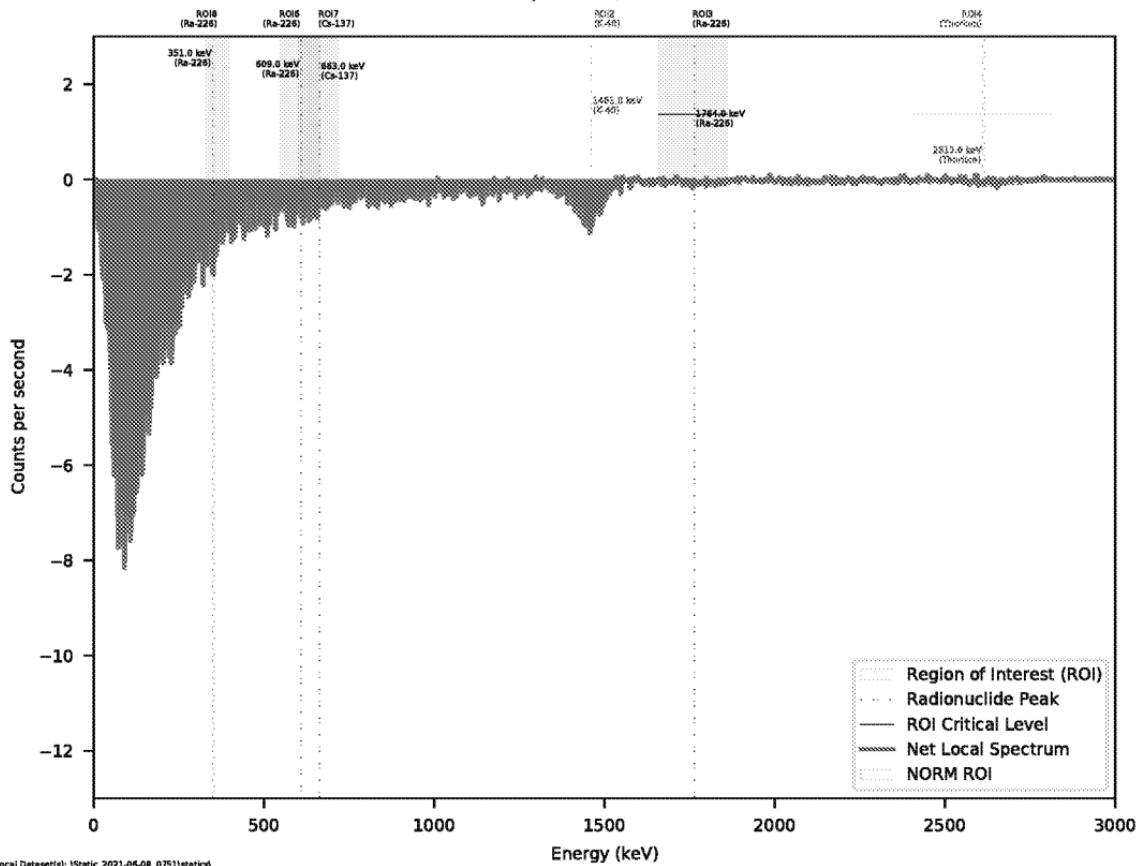


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ED\_006360A\_00000162-00028

# Net Gamma Spectrum, Static Location: 16

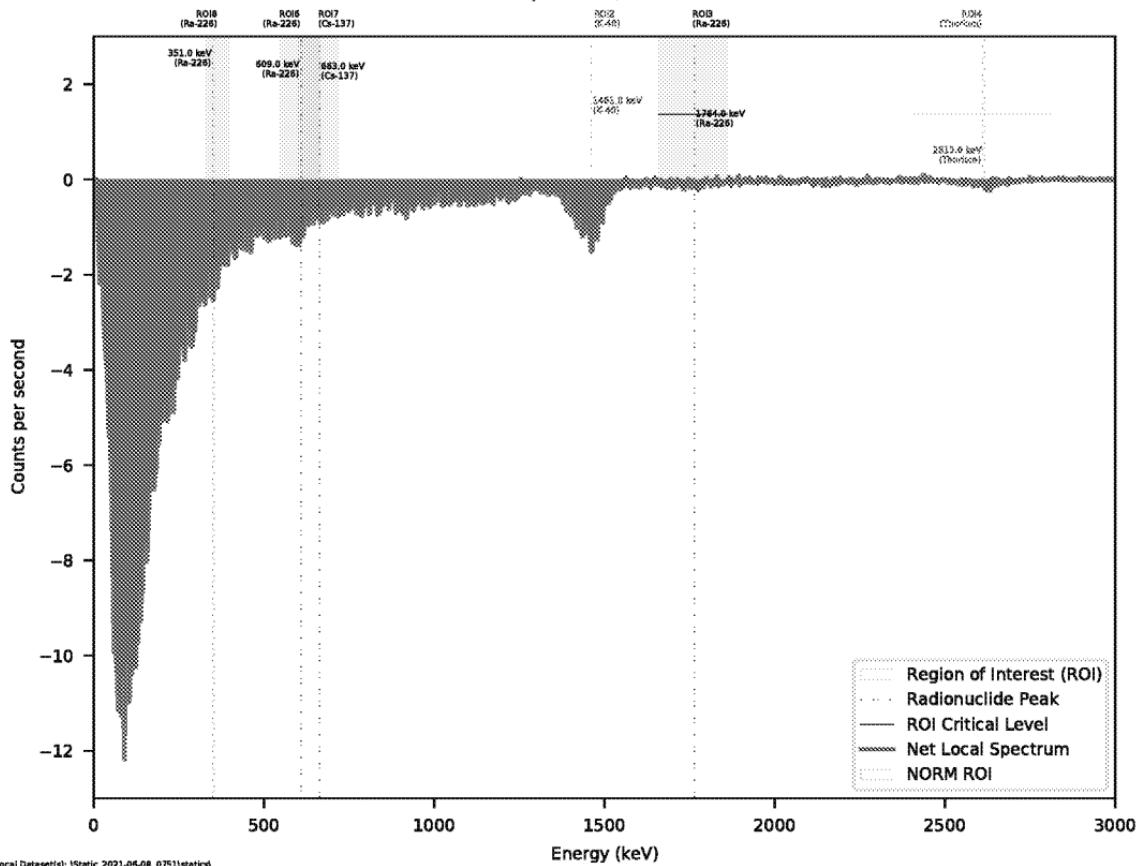


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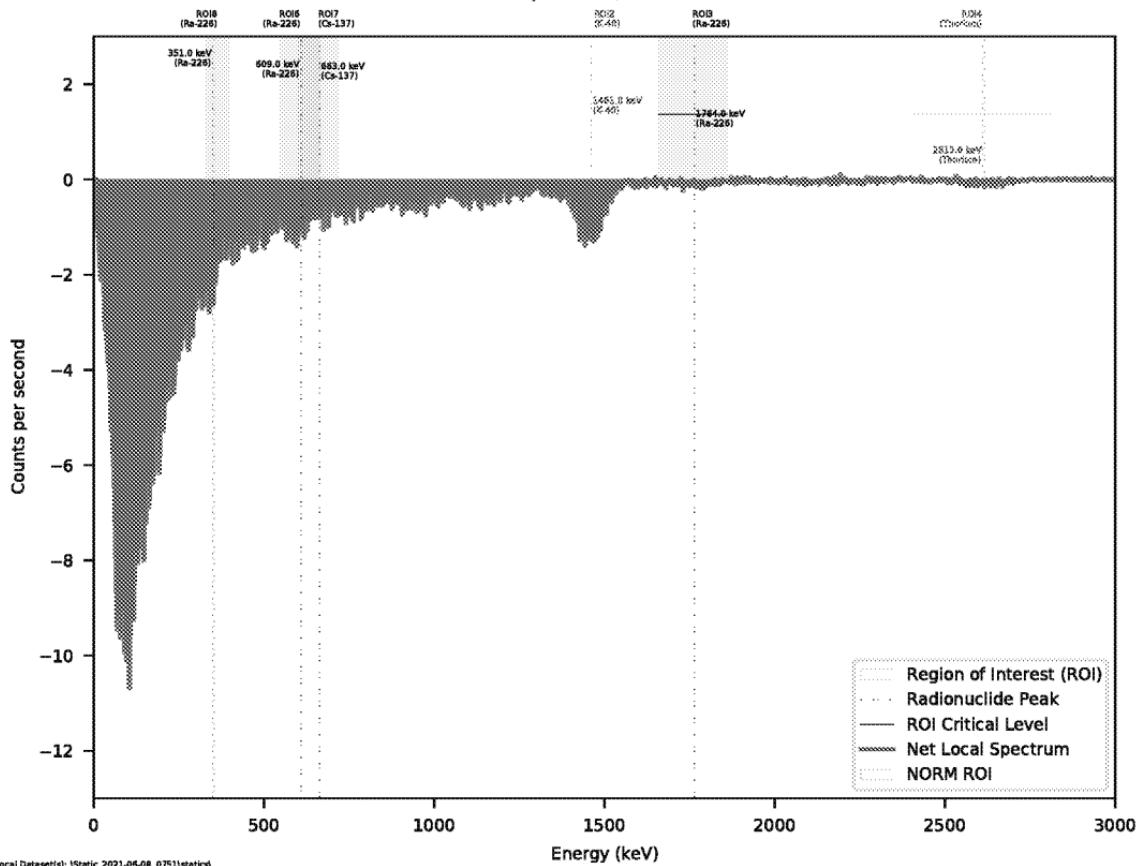
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# Net Gamma Spectrum, Static Location: 17



ED\_006360A\_00000162-00030

## Net Gamma Spectrum, Static Location: 18

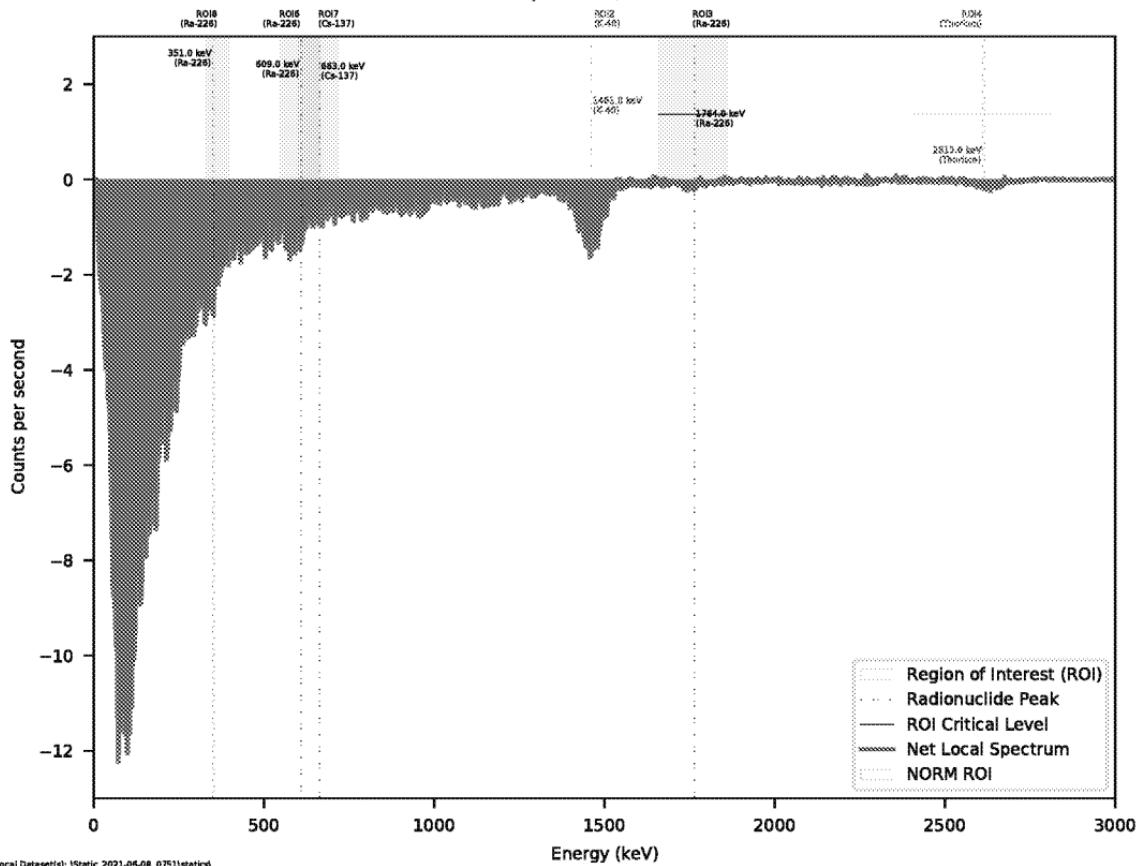


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36654535882354, 37.72309374556823

ED\_006360A\_00000162-00031

# Net Gamma Spectrum, Static Location: 19

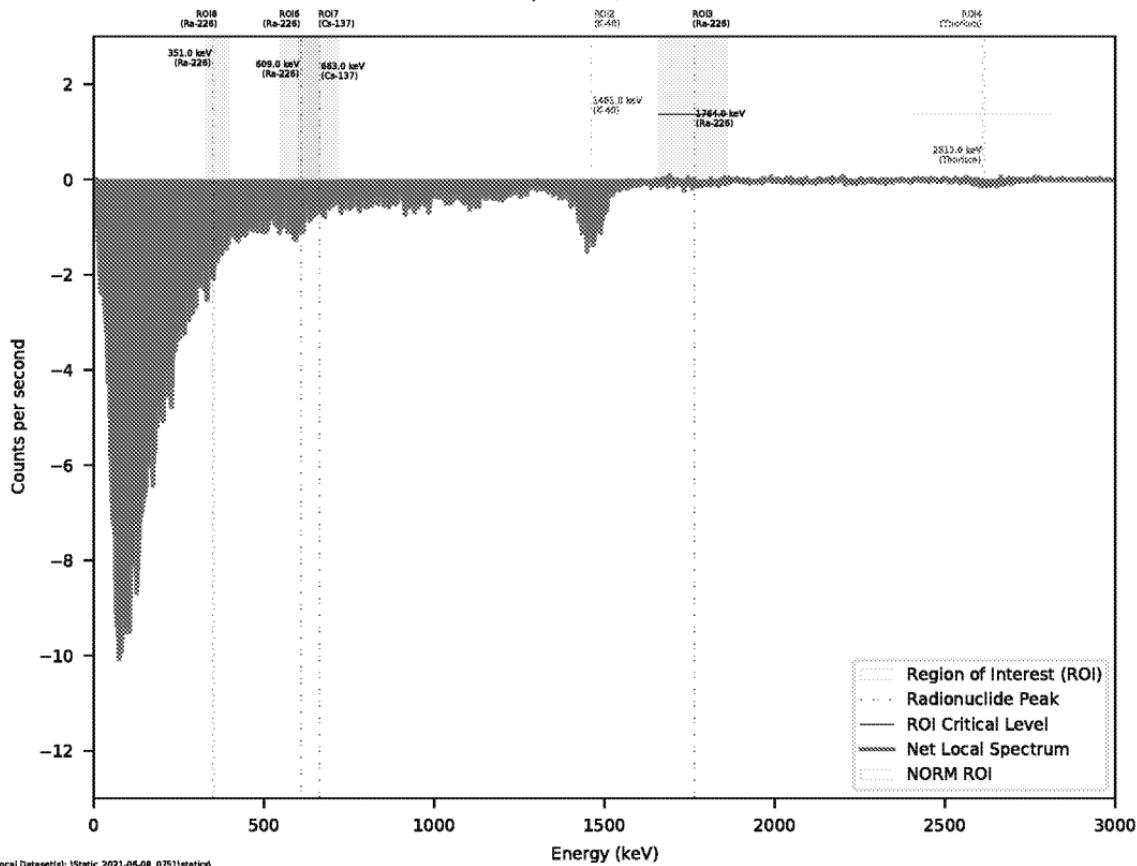


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36894454354842, 37.723074370967744

ED\_006360A\_00000162-00032

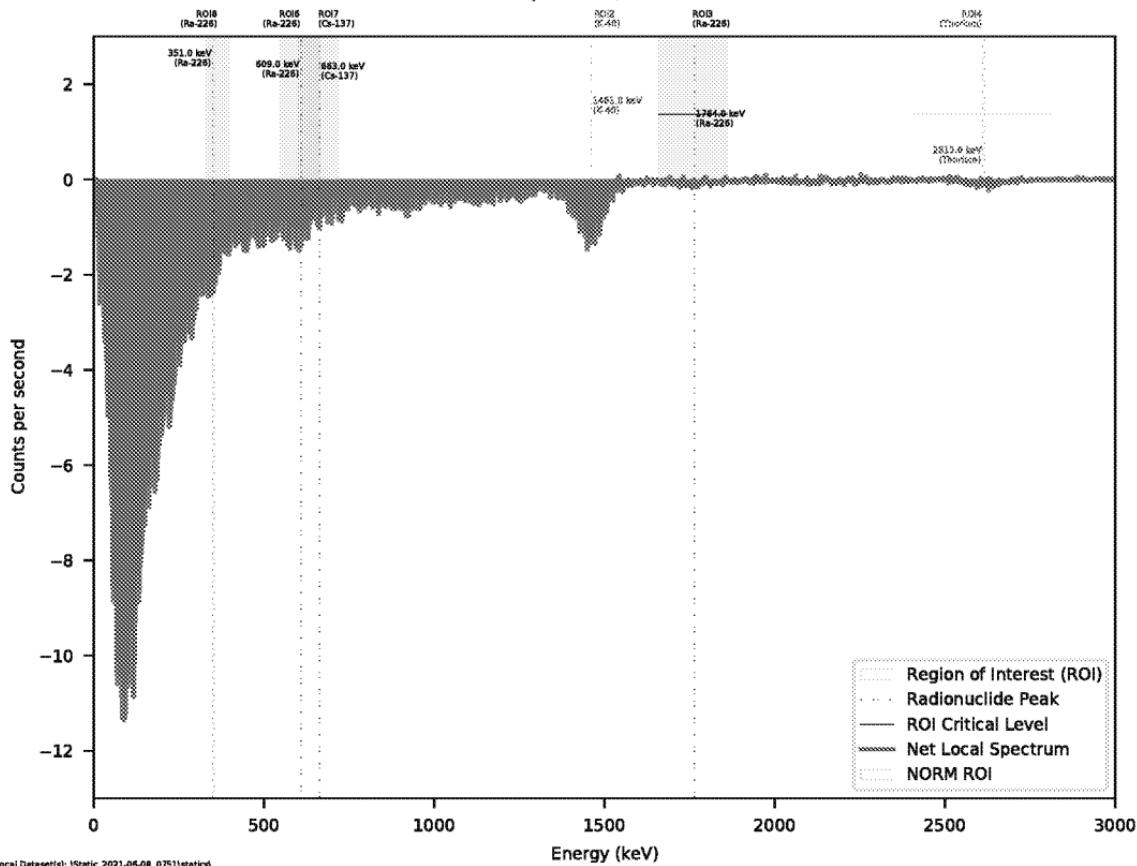
# Net Gamma Spectrum, Static Location: 20



ED\_006360A\_00000162-00033

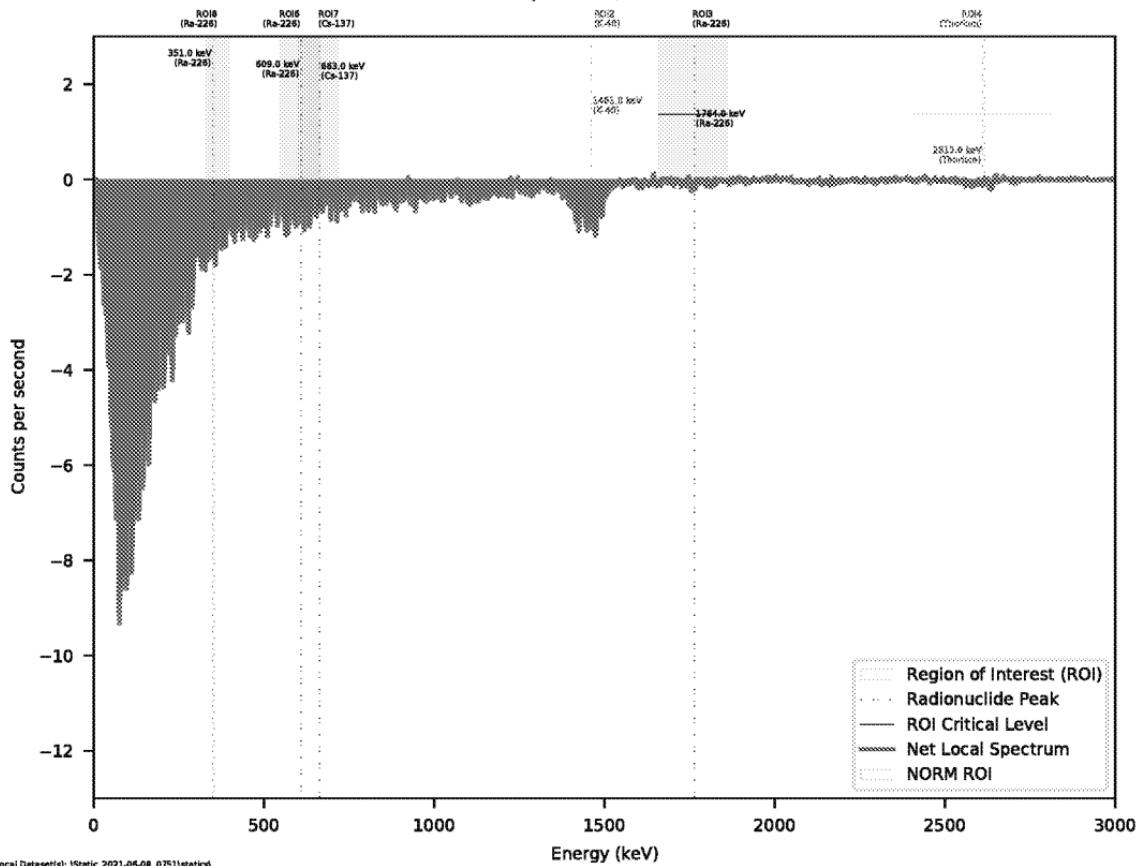
Local Coordinates (Longitude, Latitude): -122.36889244074074, 37.72301787530864

# Net Gamma Spectrum, Static Location: 21



ED\_006360A\_00000162-00034

## Net Gamma Spectrum, Static Location: 22

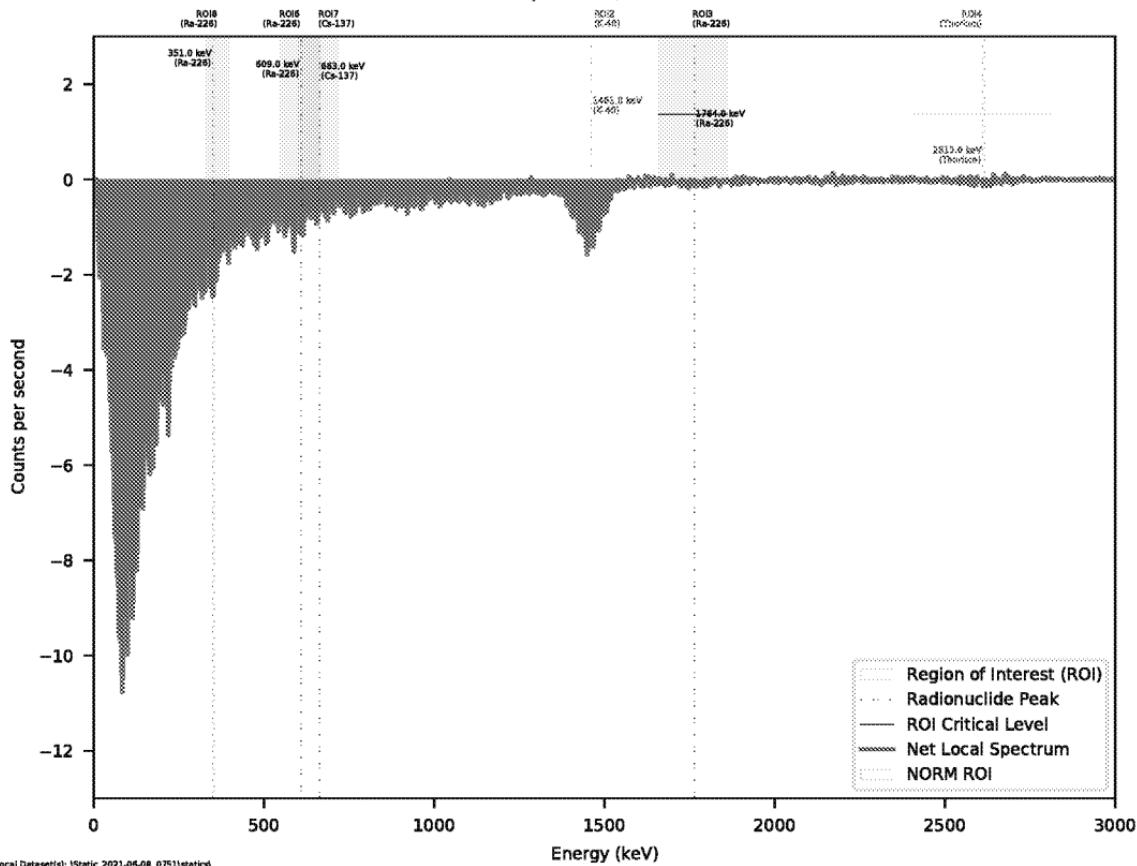


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.368872140625, 37.7229952785625

ED\_006360A\_00000162-00035

# Net Gamma Spectrum, Static Location: 23

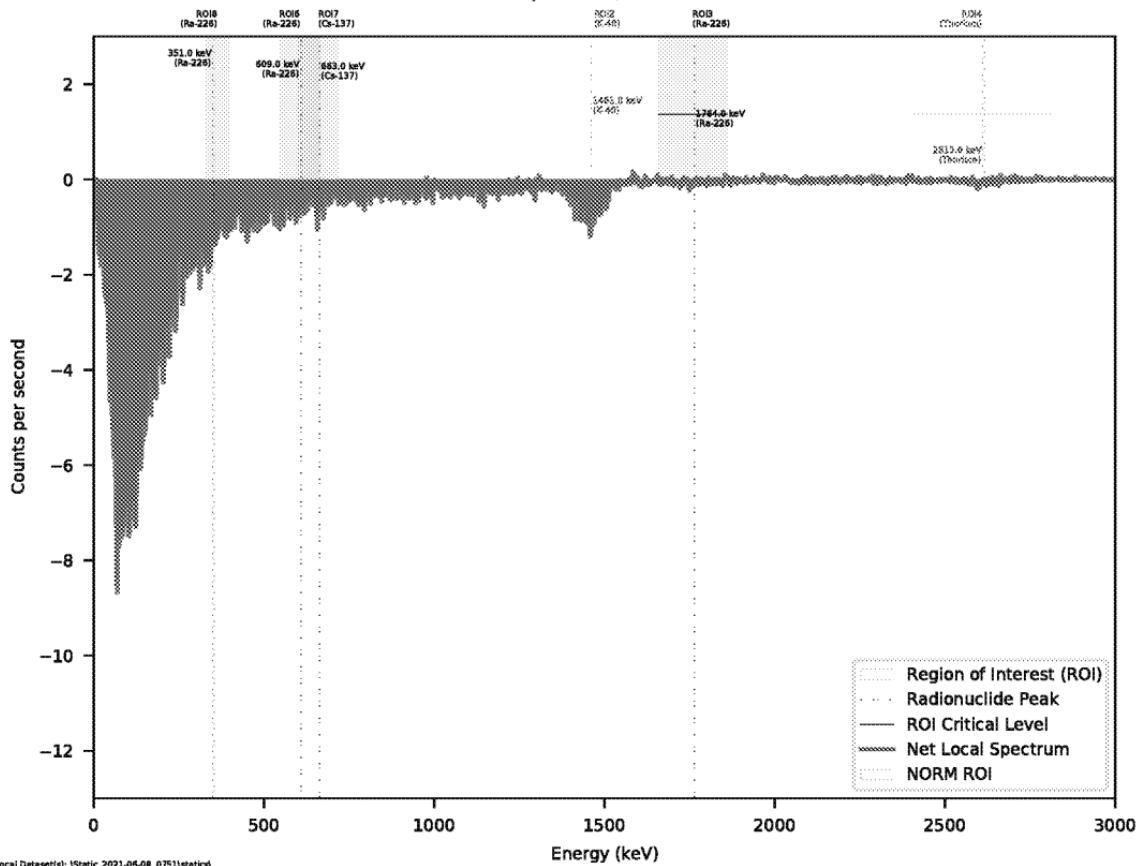


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3665471159417, 37.72311805797101

ED\_006360A\_00000162-00036

# Net Gamma Spectrum, Static Location: 24

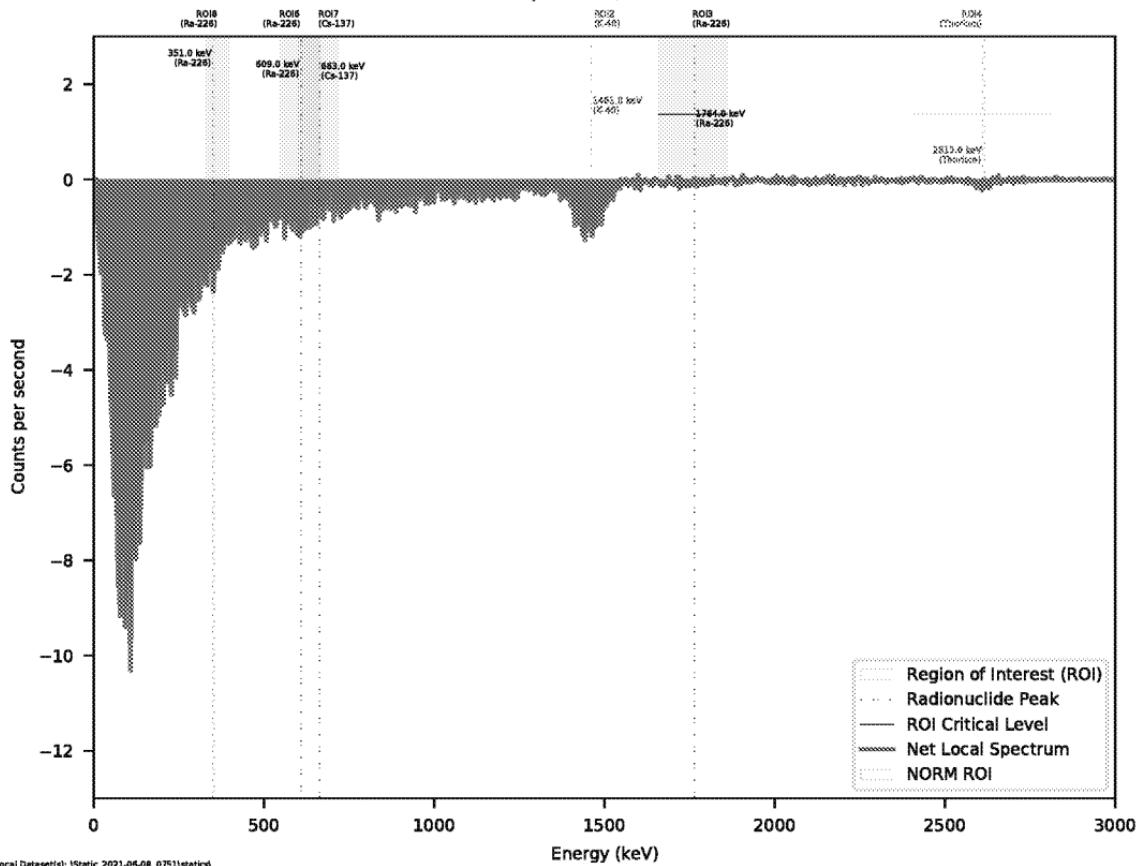


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3688799387097, 37.72298414032258

ED\_006360A\_00000162-00037

# Net Gamma Spectrum, Static Location: 25

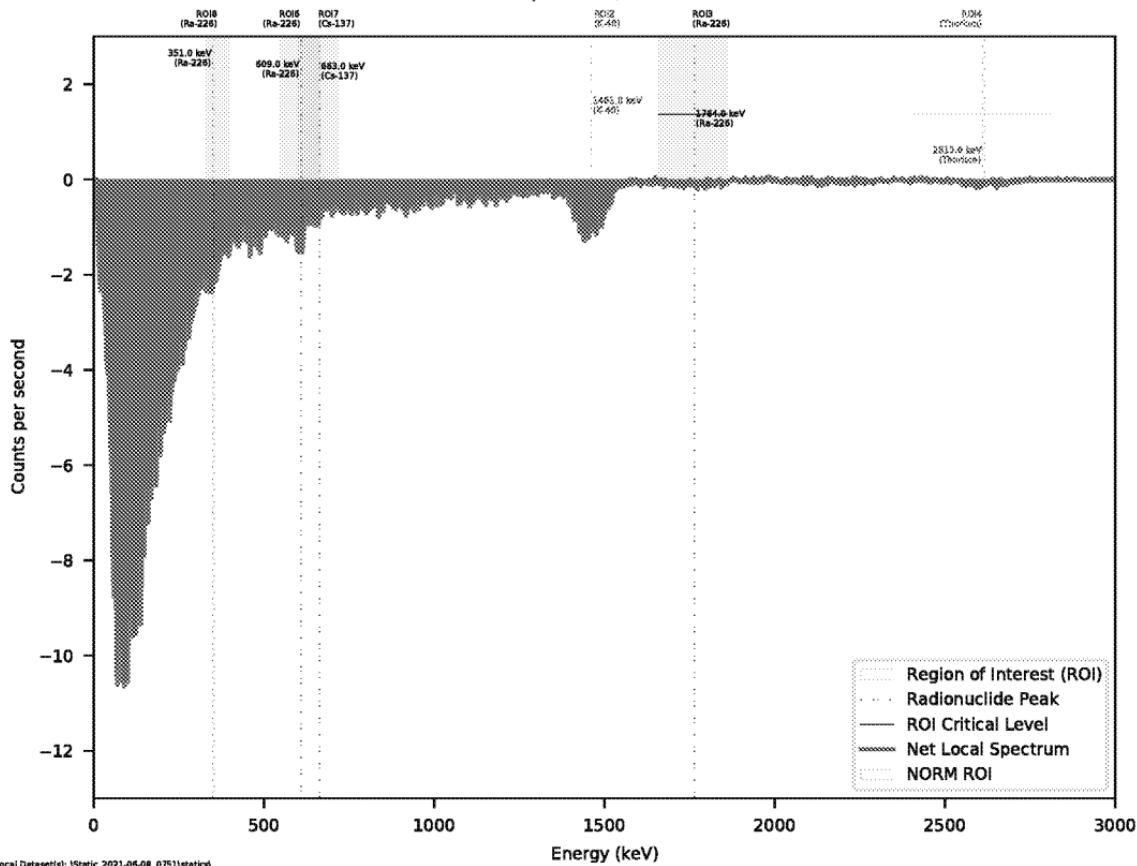


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36888091692306, 37.72300799384615

ED\_006360A\_00000162-00038

## Net Gamma Spectrum, Static Location: 26

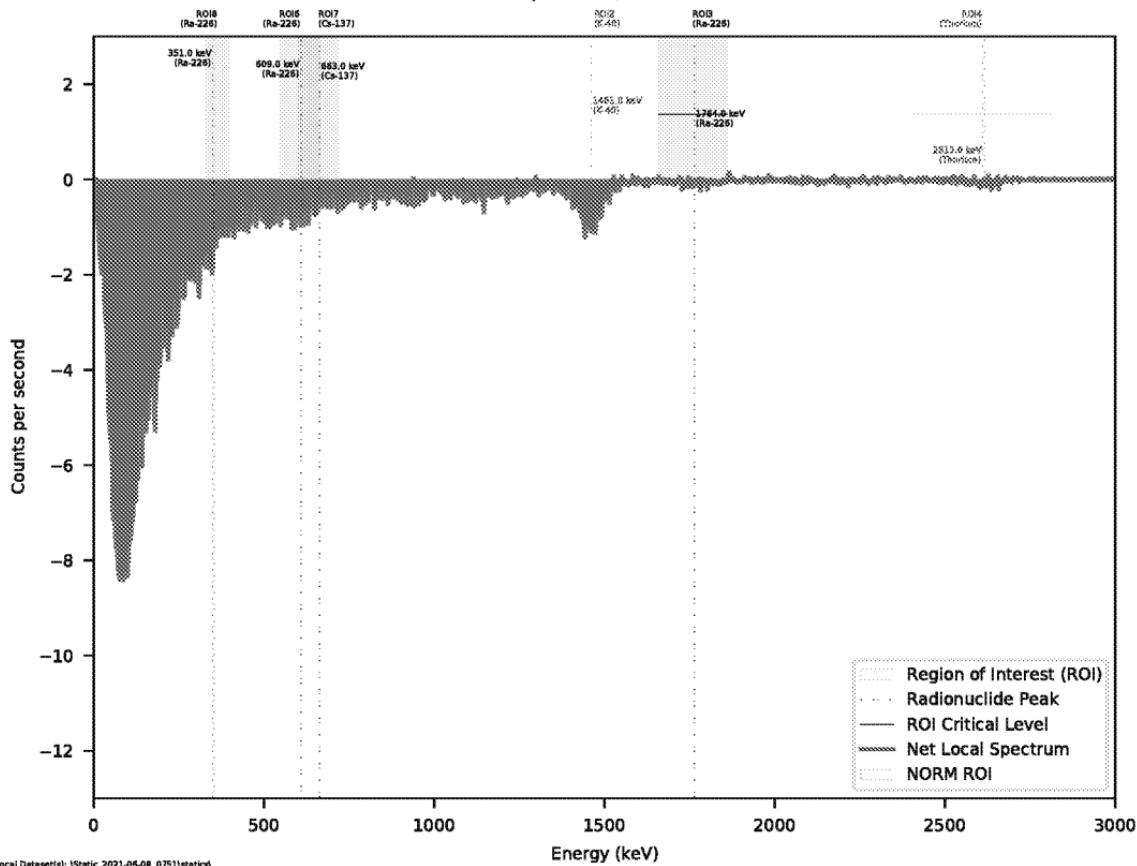


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36677267808221, 37.72301364931507

ED\_006360A\_00000162-00039

# Net Gamma Spectrum, Static Location: 27

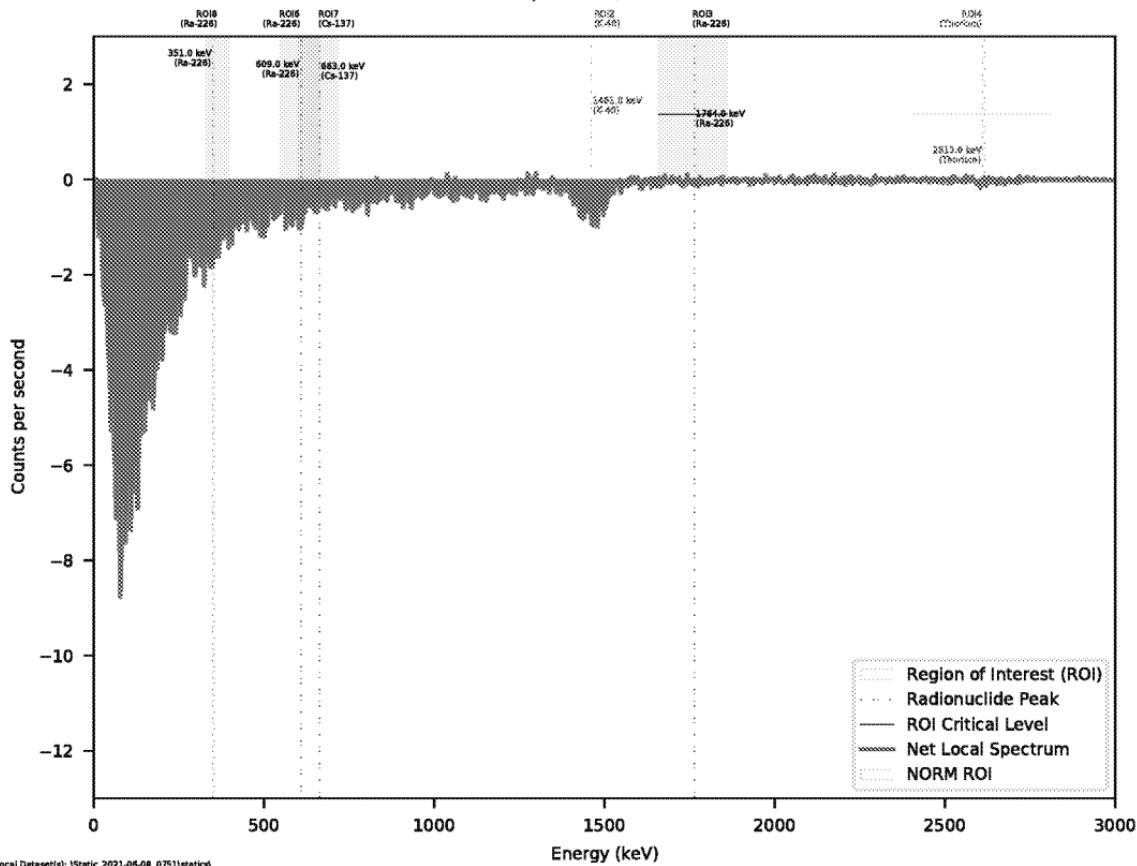


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.366902254547, 37.7229739580601

ED\_006360A\_00000162-00040

## Net Gamma Spectrum, Static Location: 28

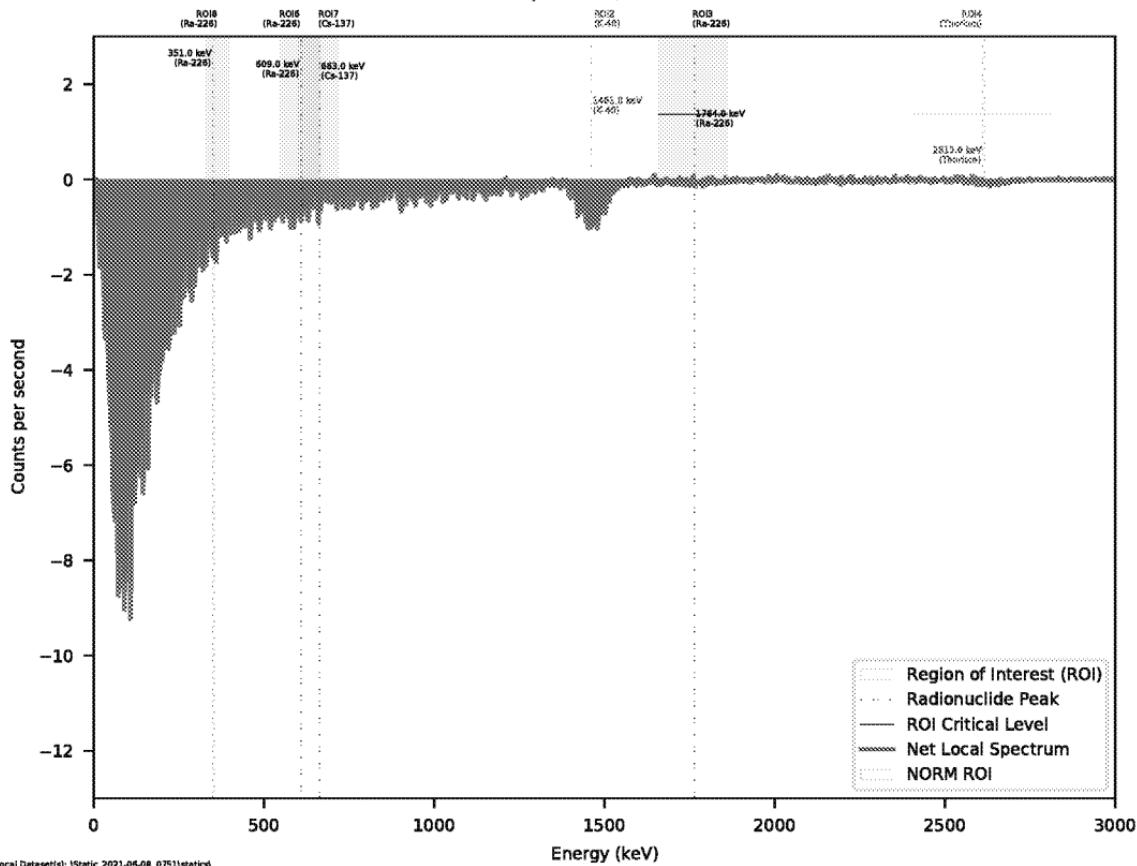


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36885608333334, 37.72299094848556

ED\_006360A\_00000162-00041

# Net Gamma Spectrum, Static Location: 29

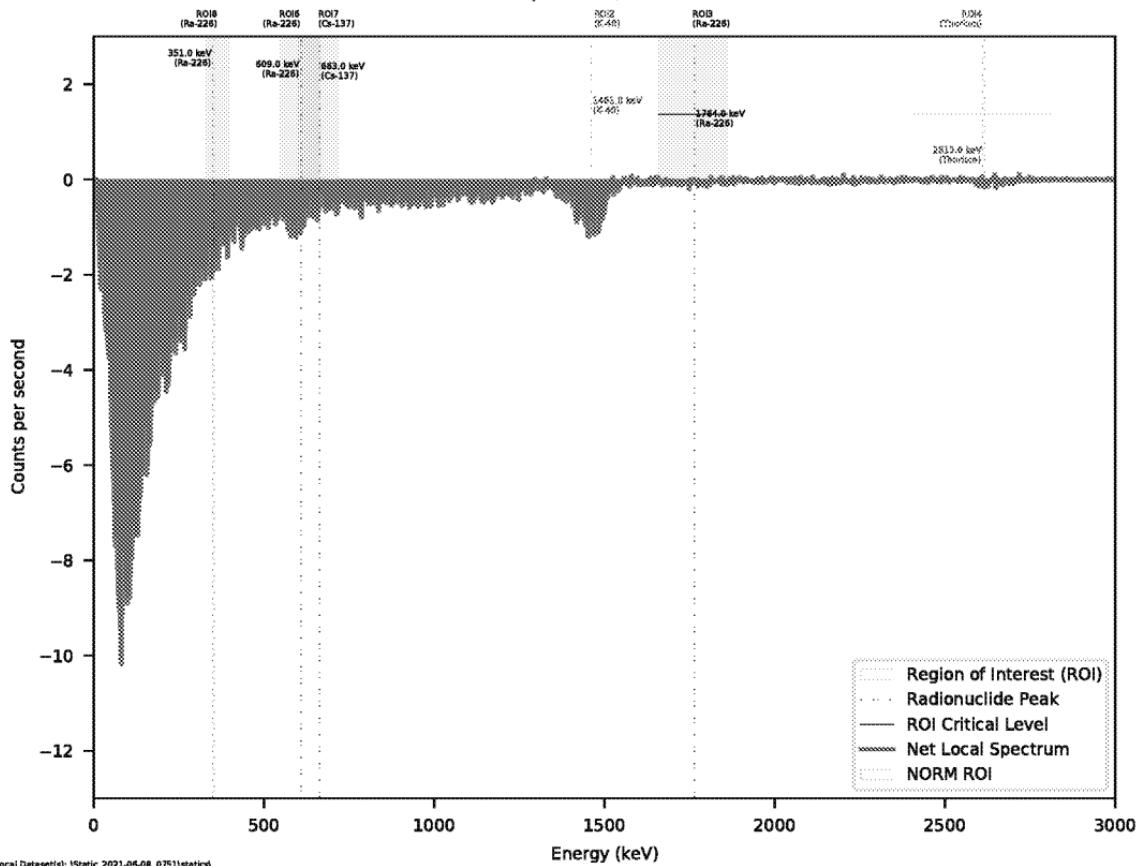


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3685585057475, 37.72298662984506

ED\_006360A\_00000162-00042

# Net Gamma Spectrum, Static Location: 30

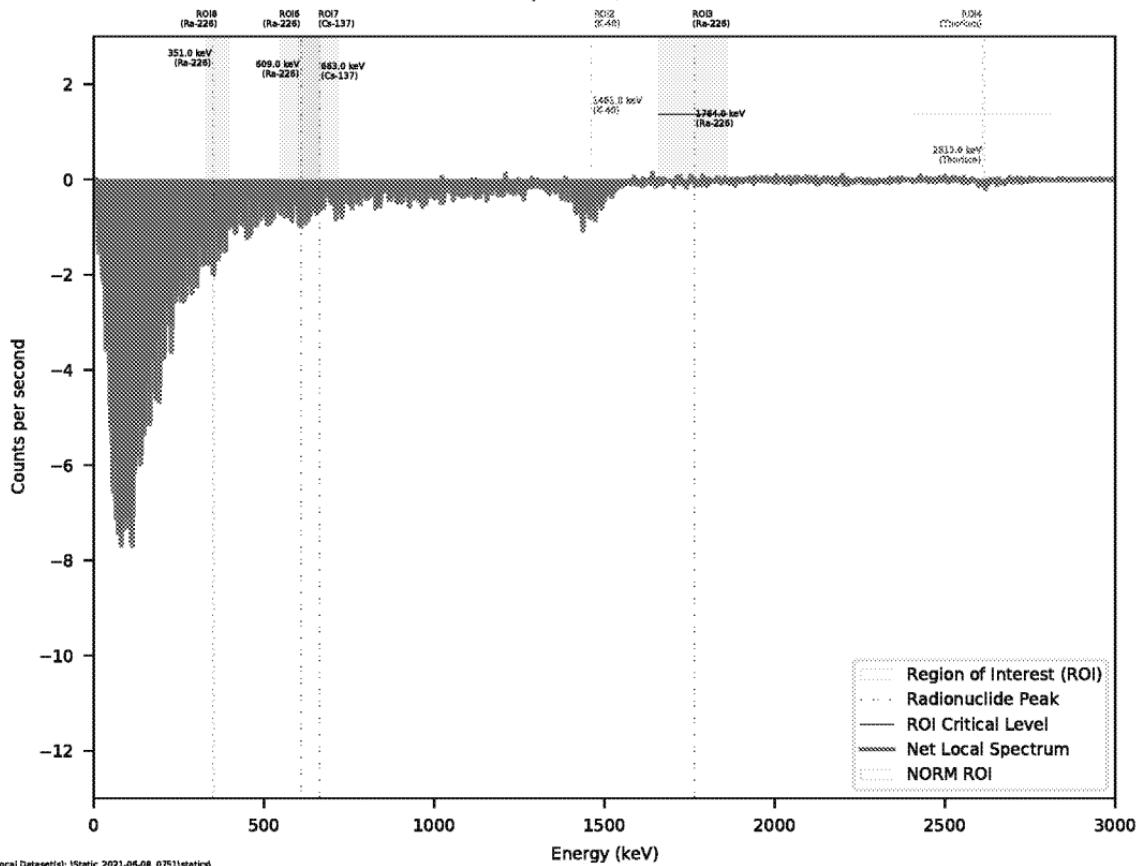


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.38890415074627, 37.7230181761194

ED\_006360A\_00000162-00043

# Net Gamma Spectrum, Static Location: 31

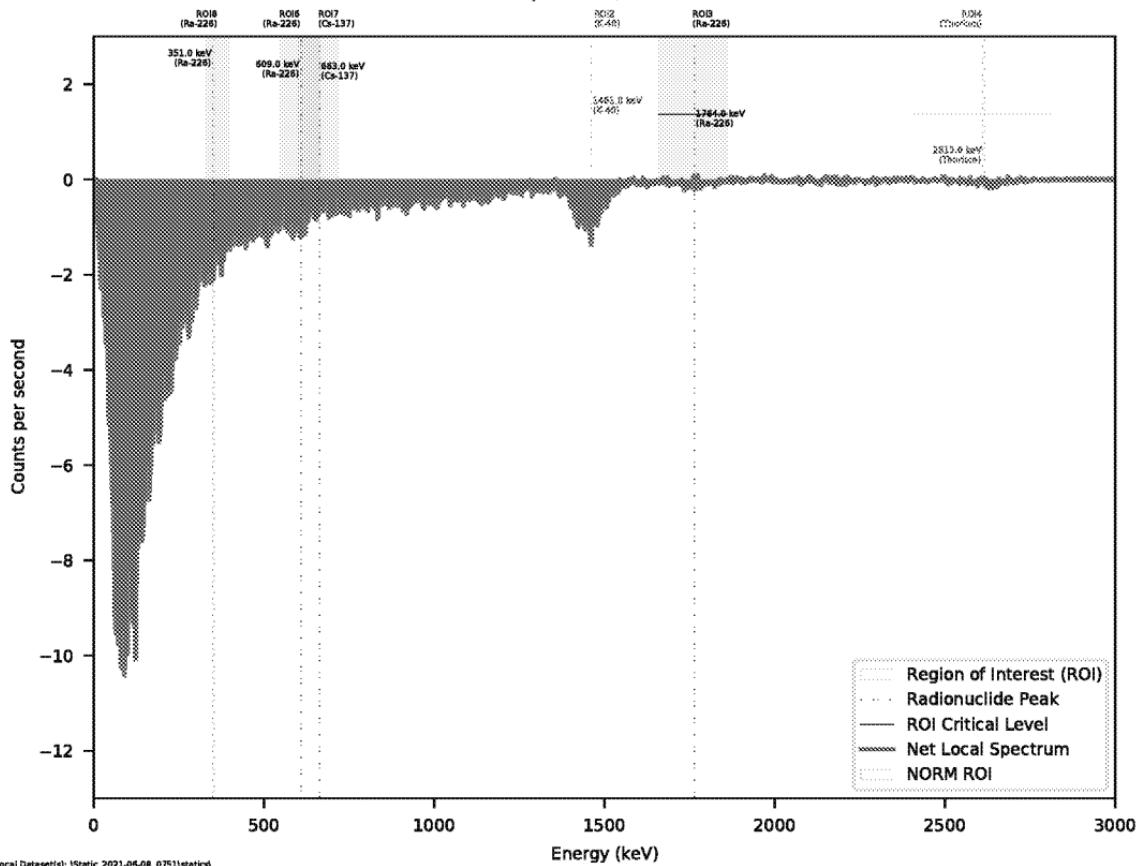


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36888603521126, 37.7229811546296

ED\_006360A\_00000162-00044

## Net Gamma Spectrum, Static Location: 32

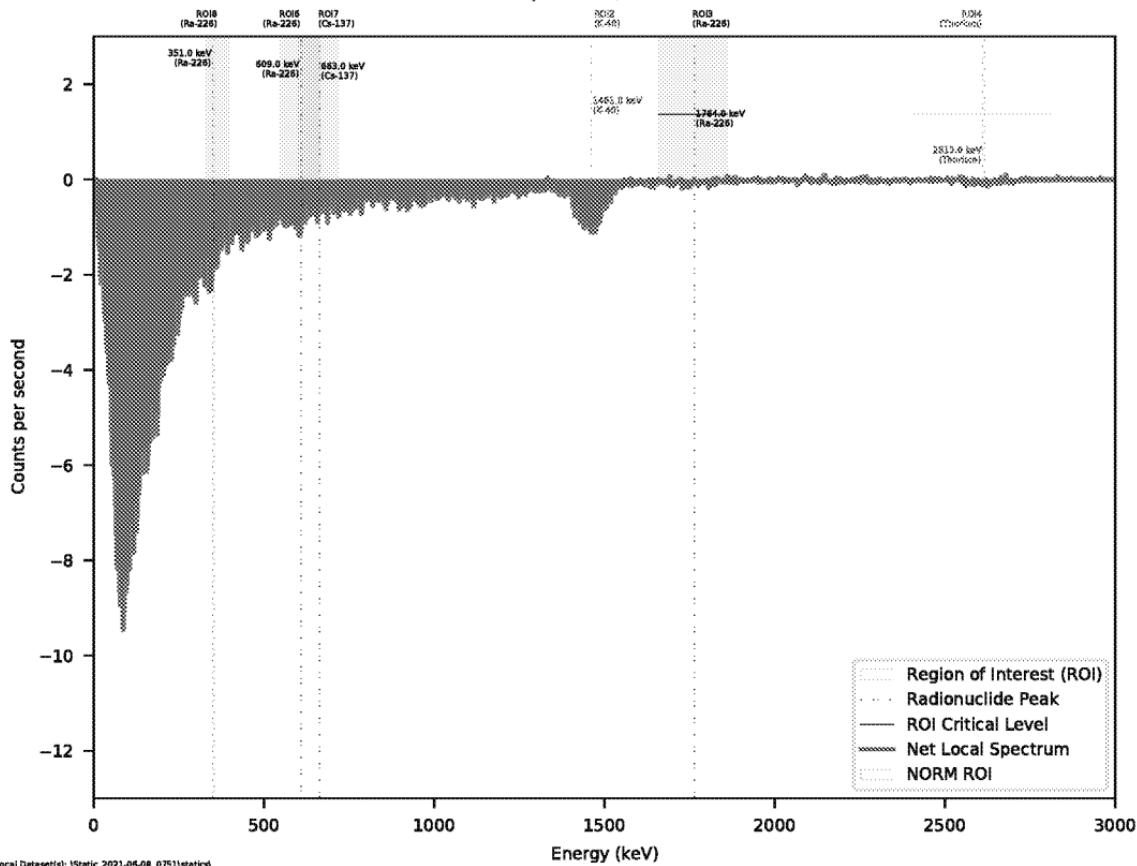


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.368830773942, 37.72300767887323

ED\_006360A\_00000162-00045

# Net Gamma Spectrum, Static Location: 33

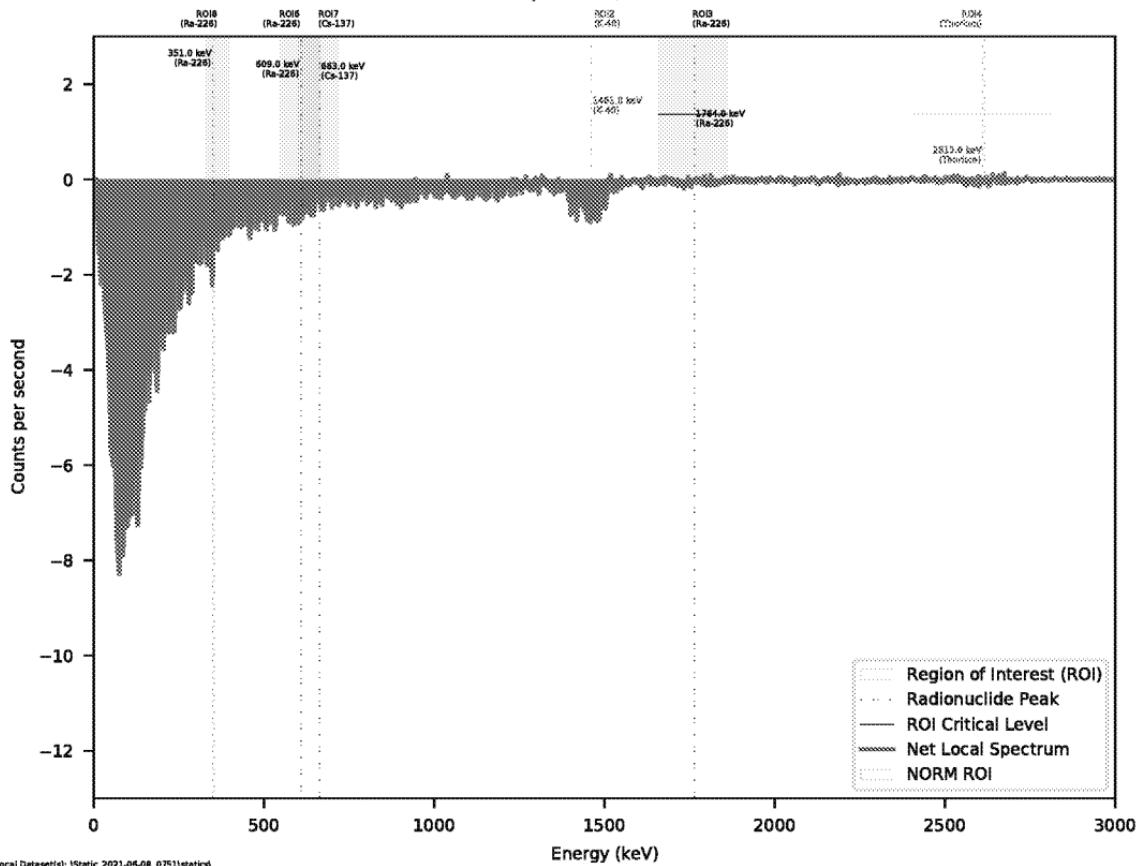


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3688945219512, 37.7230163207317

ED\_006360A\_00000162-00046

# Net Gamma Spectrum, Static Location: 34

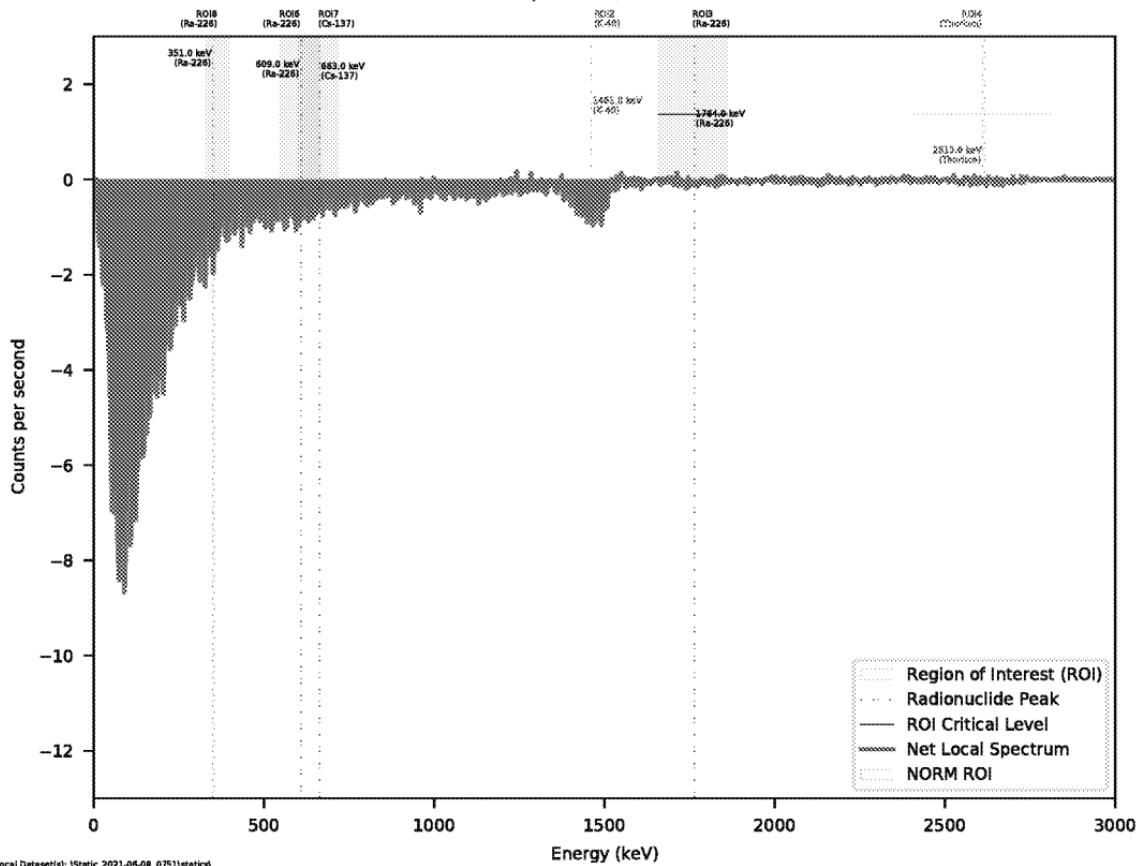


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36883704558825, 37.72300127205883

ED\_006360A\_00000162-00047

# Net Gamma Spectrum, Static Location: 35

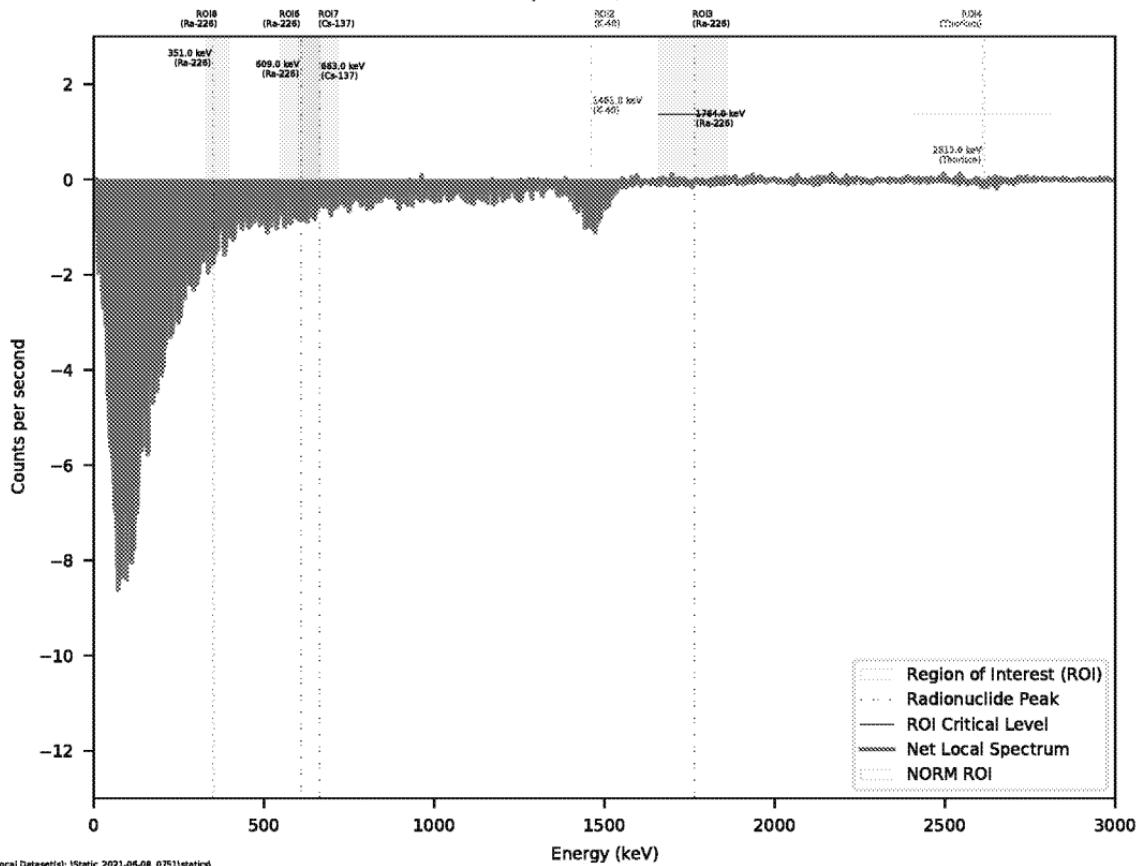


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3688427030303, 37.722995262121195

ED\_006360A\_00000162-00048

# Net Gamma Spectrum, Static Location: 36

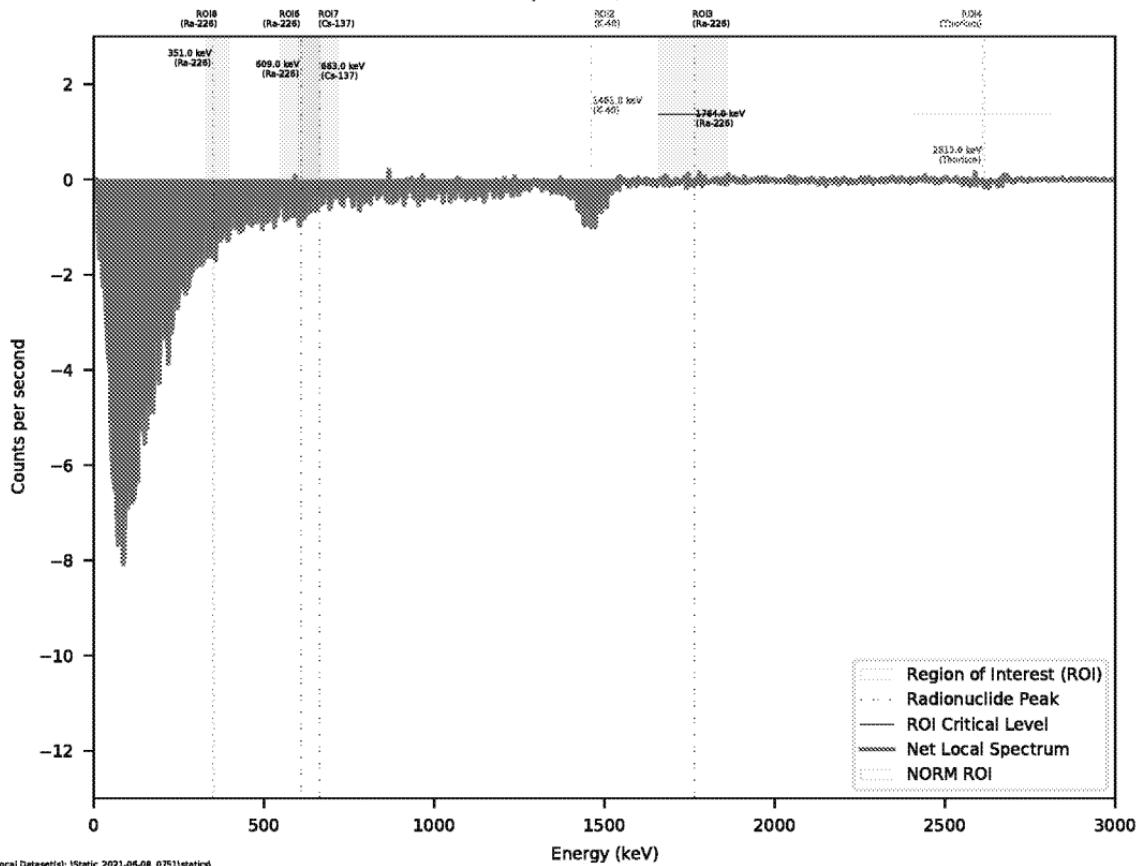


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3688999393994, 37.722970068181815

**ED\_006360A\_00000162-00049**

# Net Gamma Spectrum, Static Location: 37

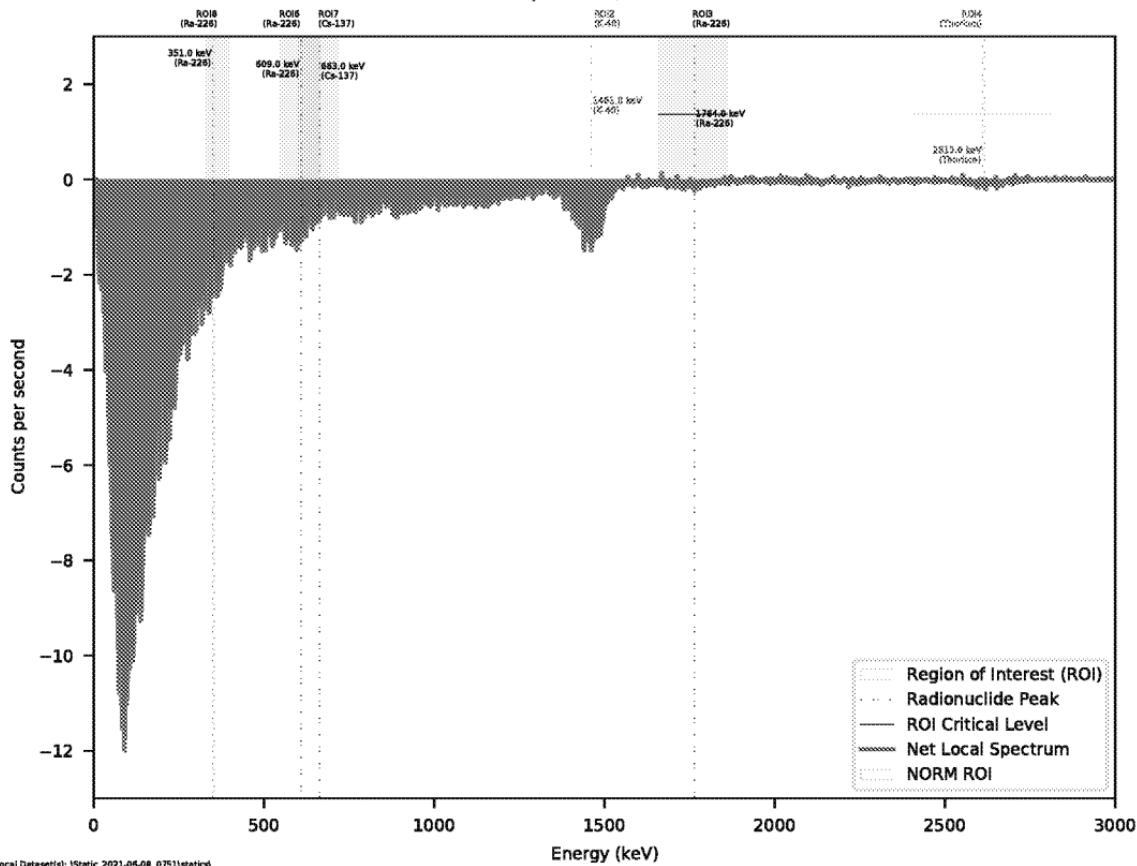


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3888597867647, 37.72300335441178

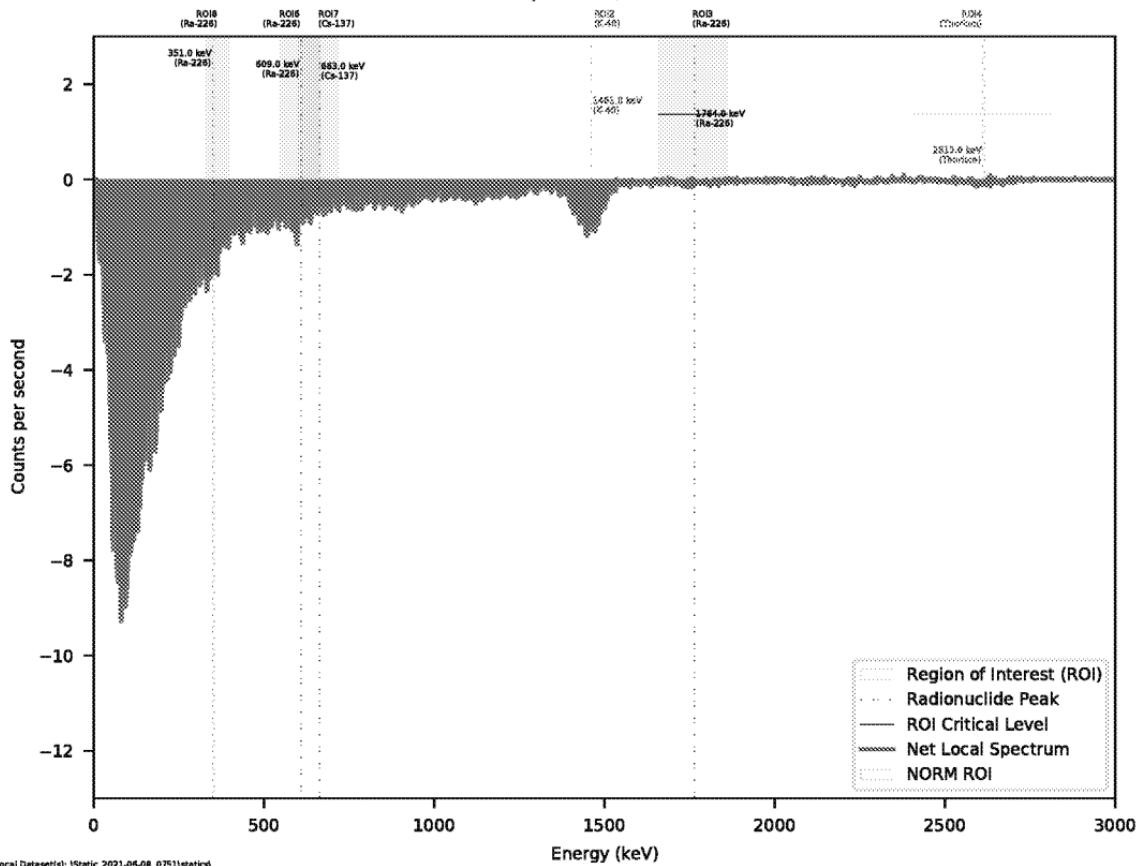
ED\_006360A\_00000162-00050

## Net Gamma Spectrum, Static Location: 38



ED\_006360A\_00000162-00051

# Net Gamma Spectrum, Static Location: 39

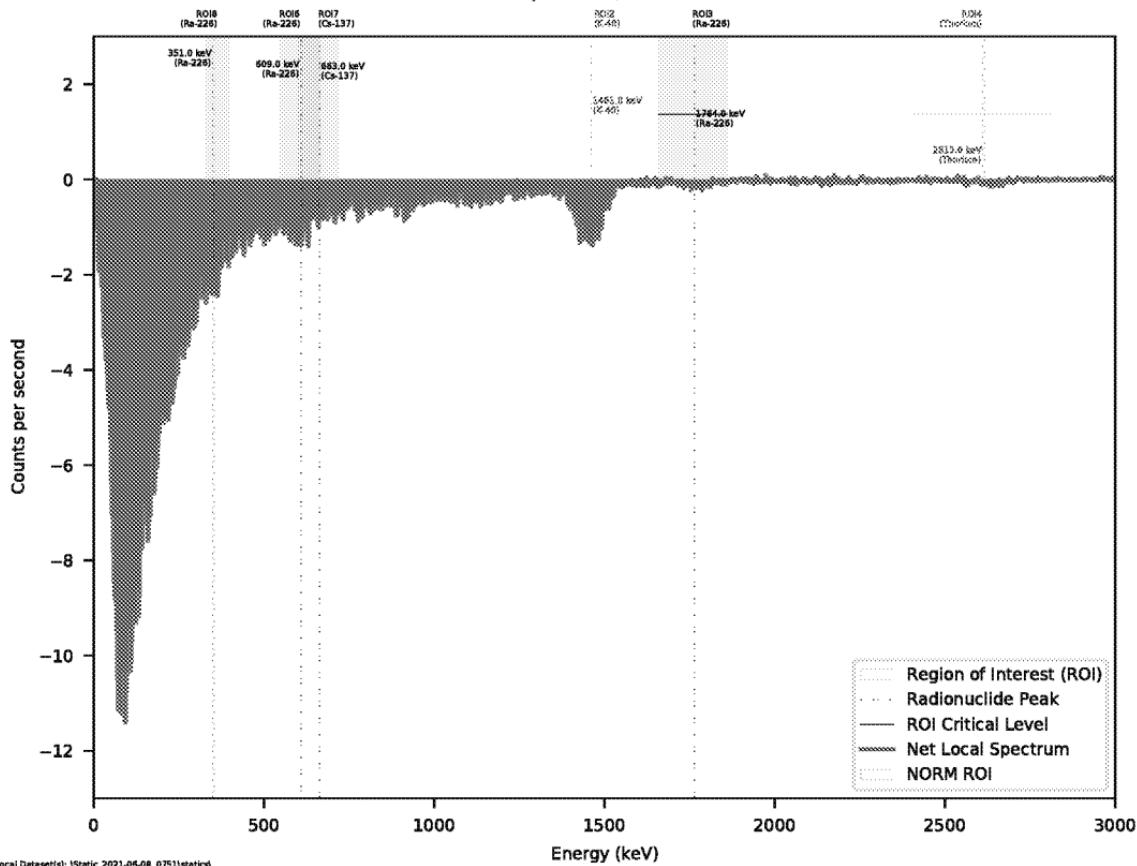


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36889765208332, 37.723034259375

ED\_006360A\_00000162-00052

# Net Gamma Spectrum, Static Location: 40

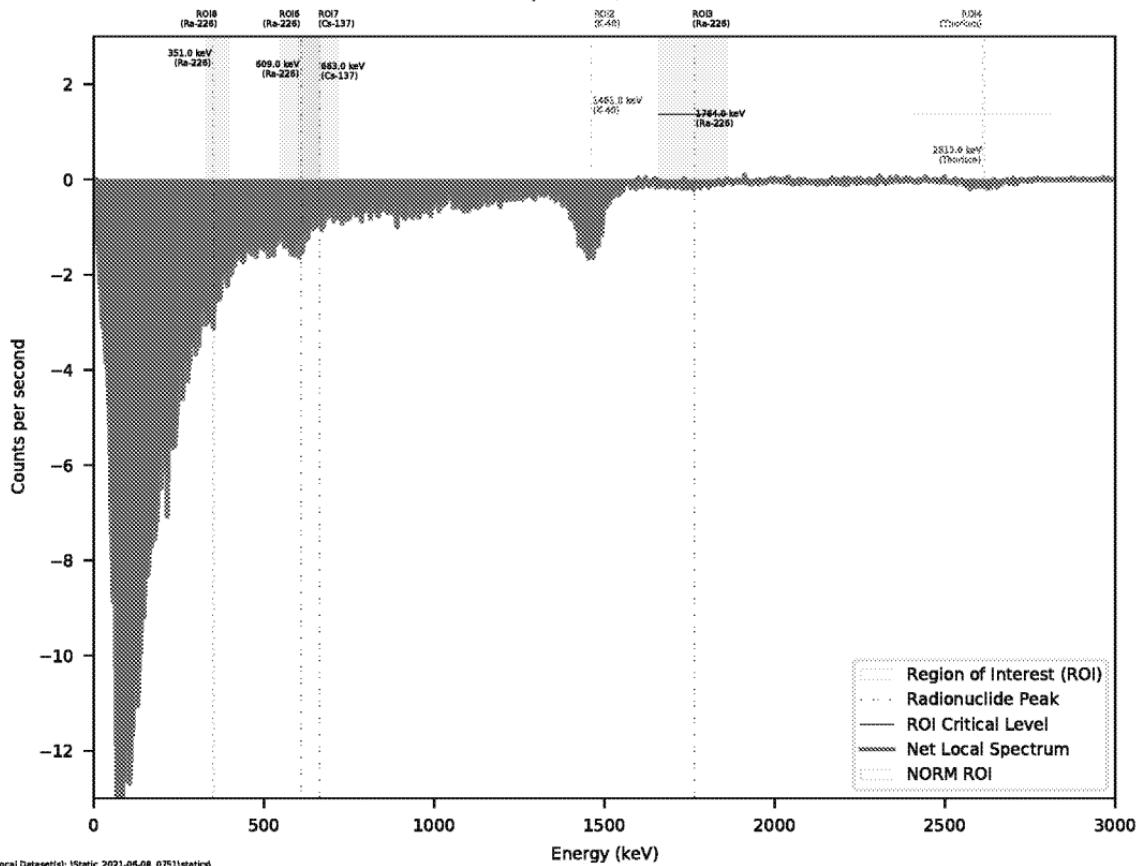


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36672611944445, 37.723048140277776

ED\_006360A\_00000162-00053

# Net Gamma Spectrum, Static Location: 41

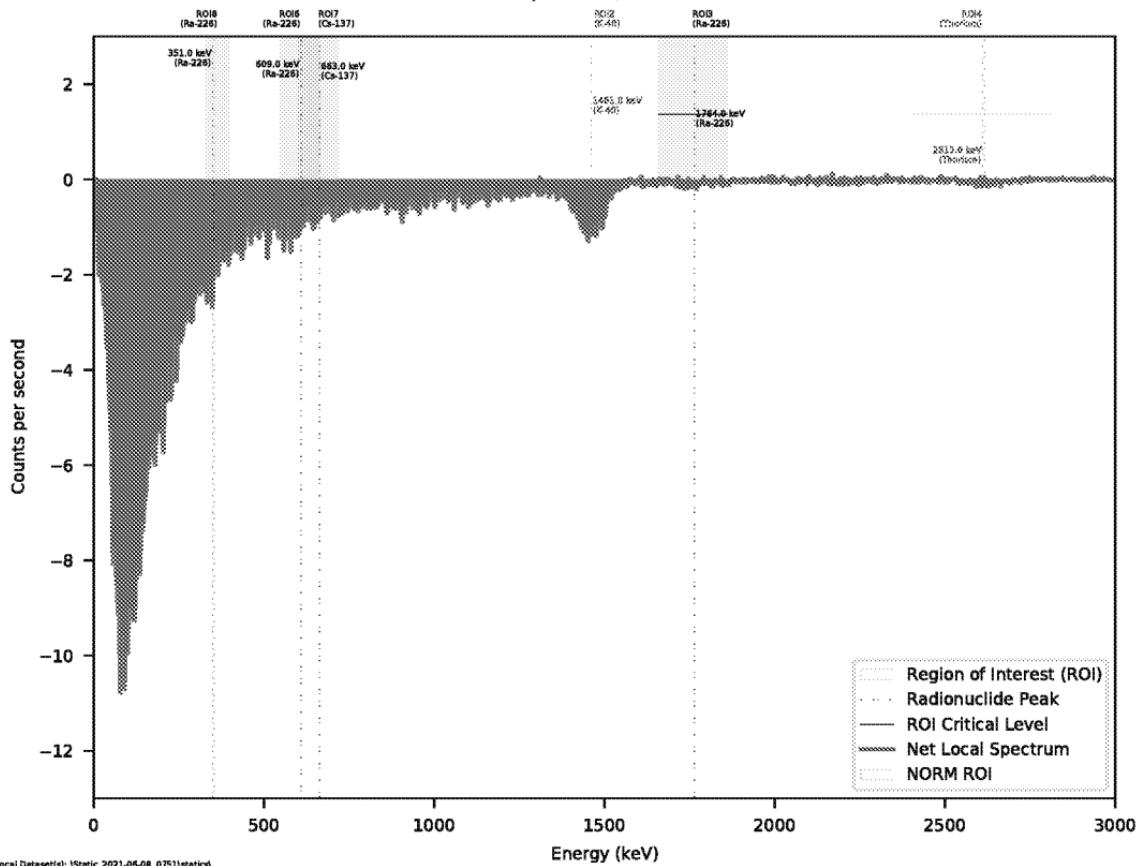


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.38874797230787, 37.72311116

ED\_006360A\_00000162-00054

# Net Gamma Spectrum, Static Location: 42

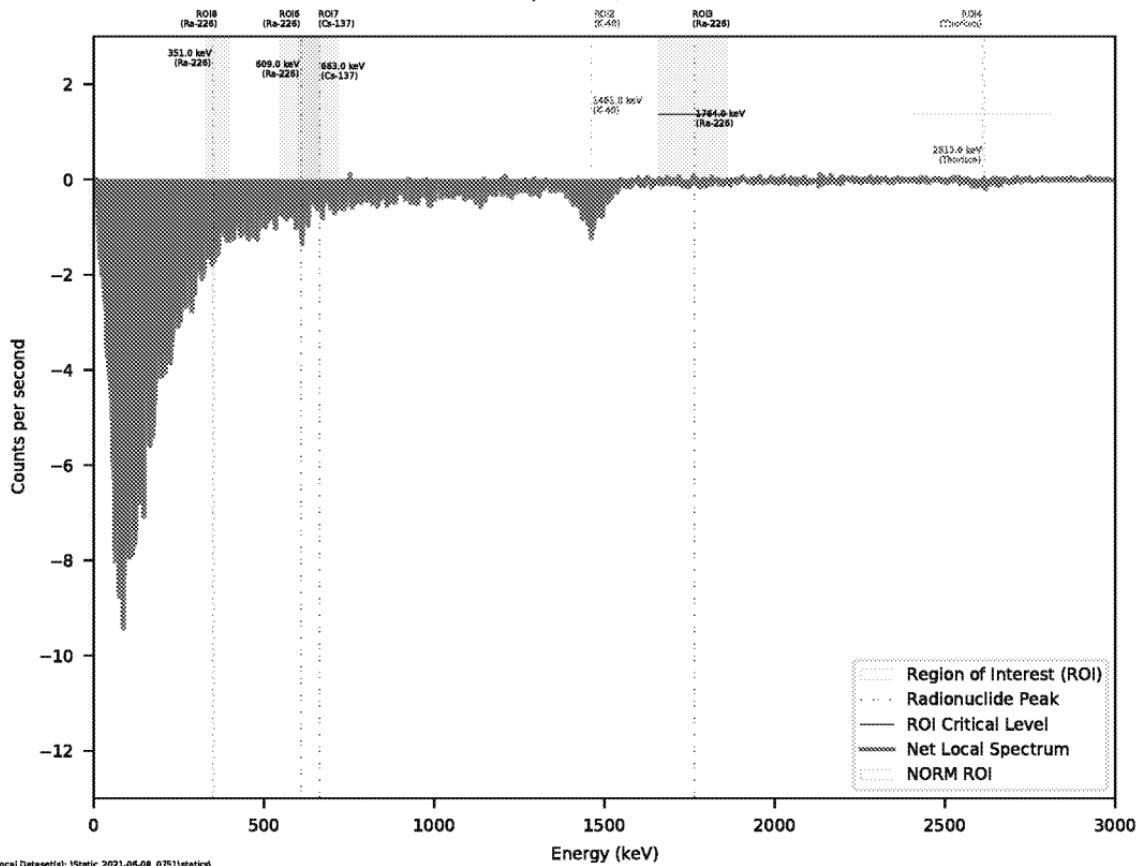


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36887145468751, 37.72303109531246

ED\_006360A\_00000162-00055

# Net Gamma Spectrum, Static Location: 43

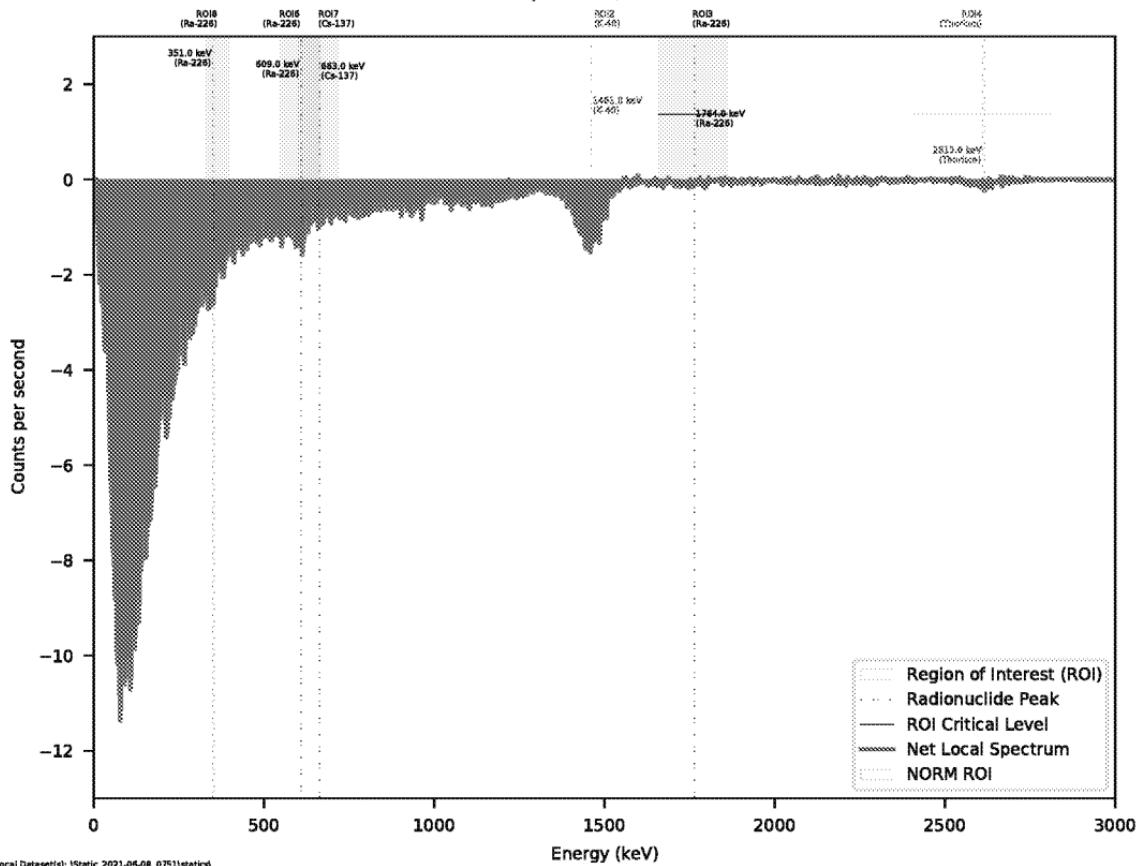


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3685485076922, 37.72298172769231

ED\_006360A\_00000162-00056

# Net Gamma Spectrum, Static Location: 44

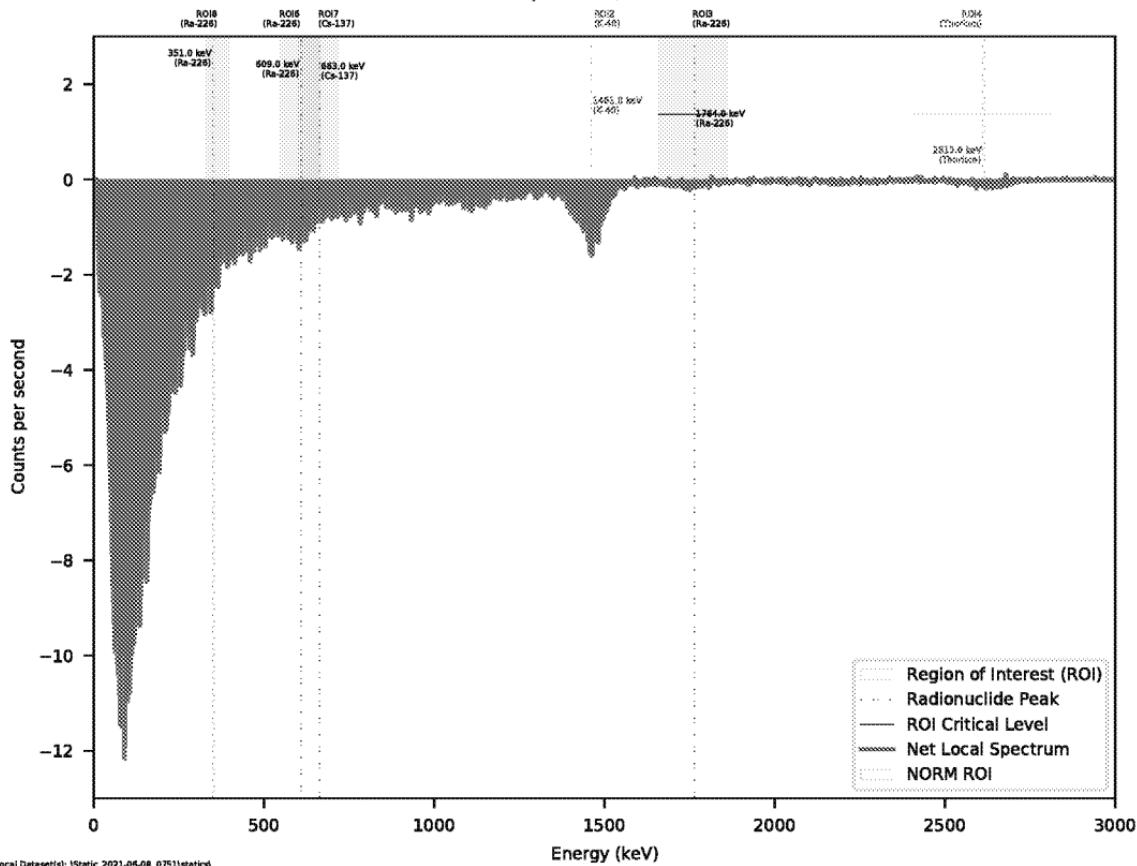


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.366865626855, 37.72310091343285

**ED\_006360A\_00000162-00057**

# Net Gamma Spectrum, Static Location: 45

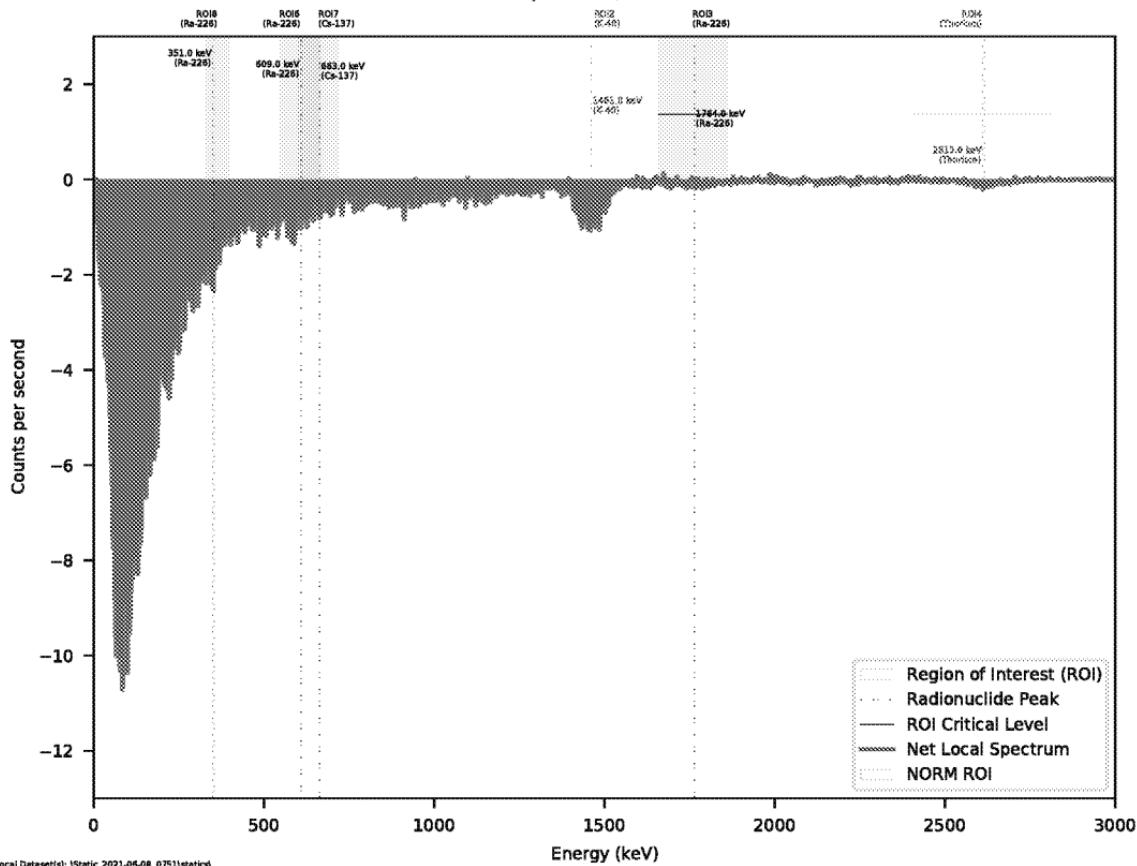


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36867196164384, 37.72301596436356

ED\_006360A\_00000162-00058

# Net Gamma Spectrum, Static Location: 46

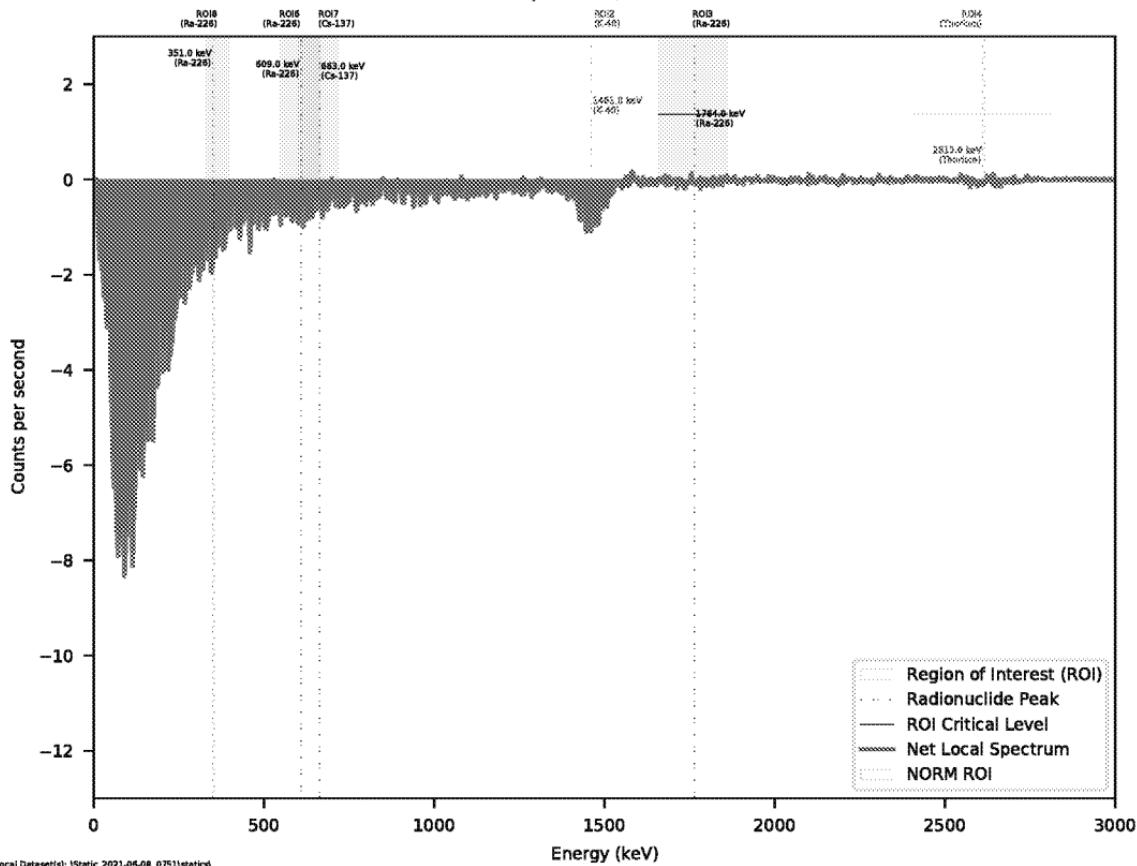


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36885785000004, 37.72297326571428

ED\_006360A\_00000162-00059

# Net Gamma Spectrum, Static Location: 47

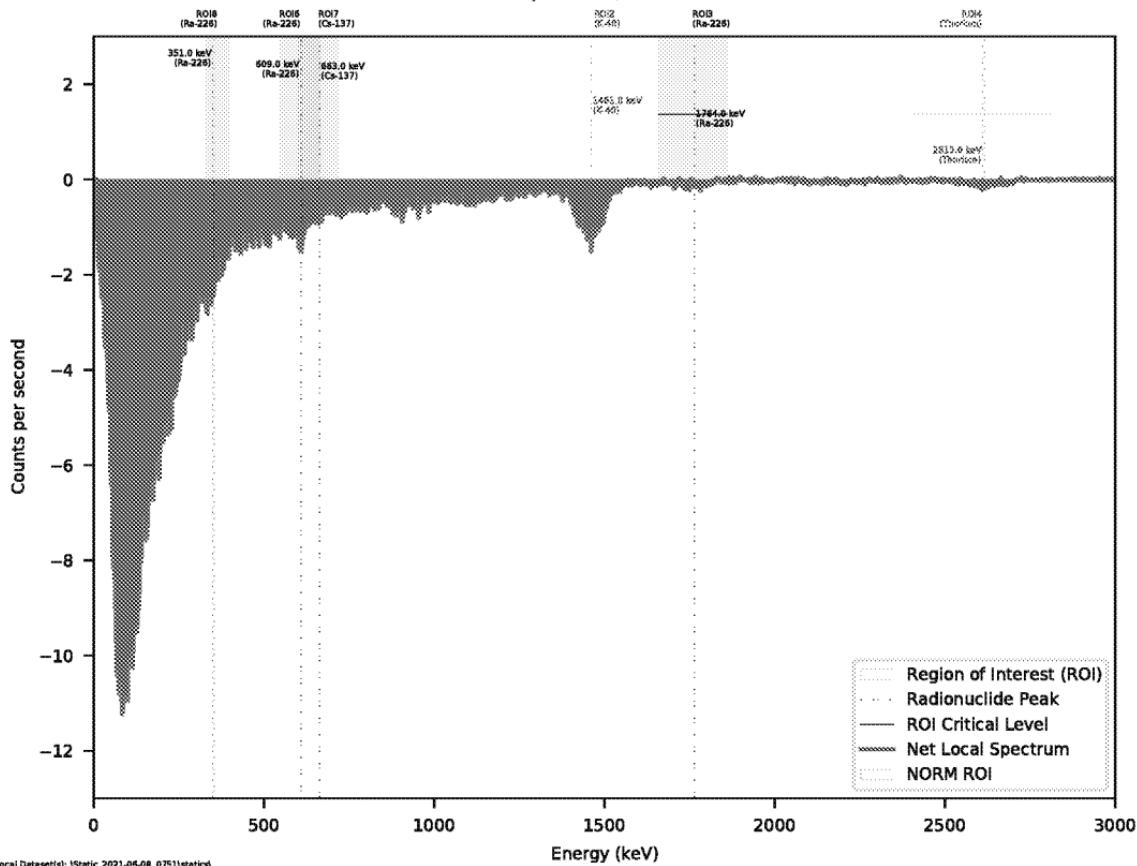


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3688779402985, 37.72297747910448

ED\_006360A\_00000162-00060

# Net Gamma Spectrum, Static Location: 48

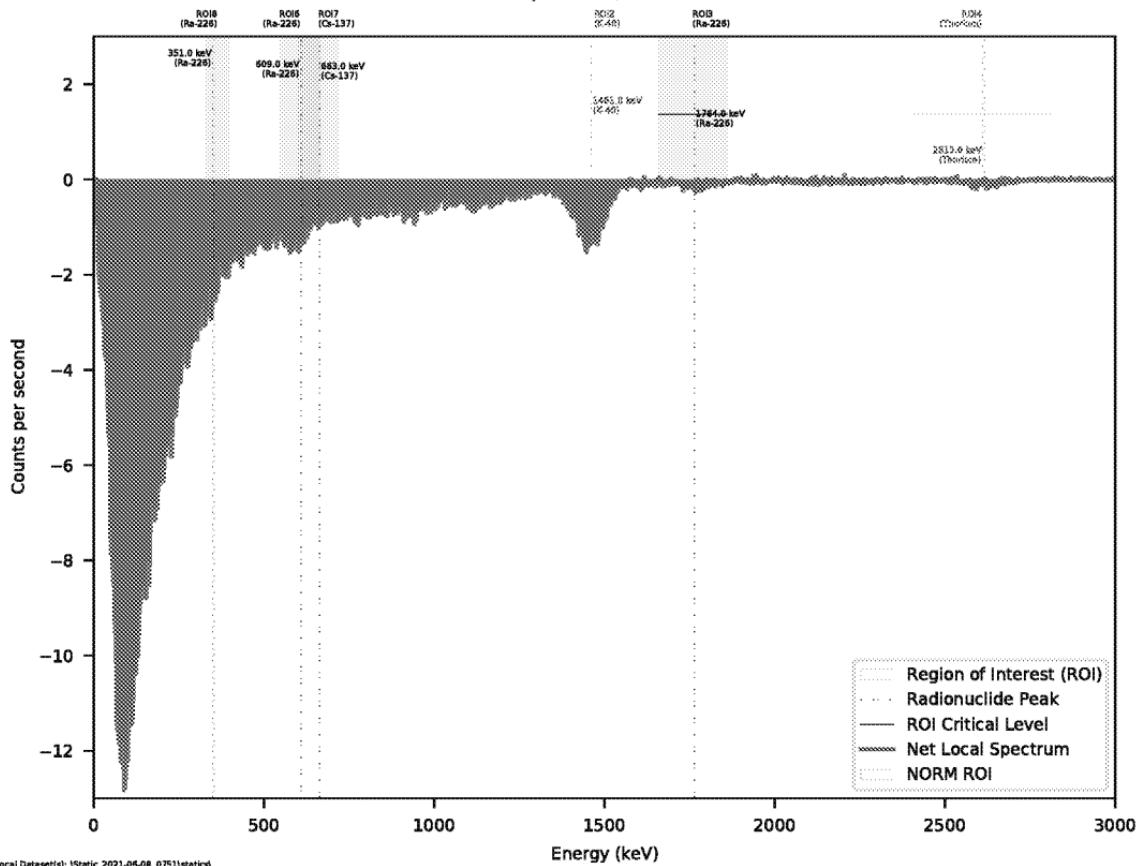


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3665637241375, 37.72313535287358

ED\_006360A\_00000162-00061

# Net Gamma Spectrum, Static Location: 49

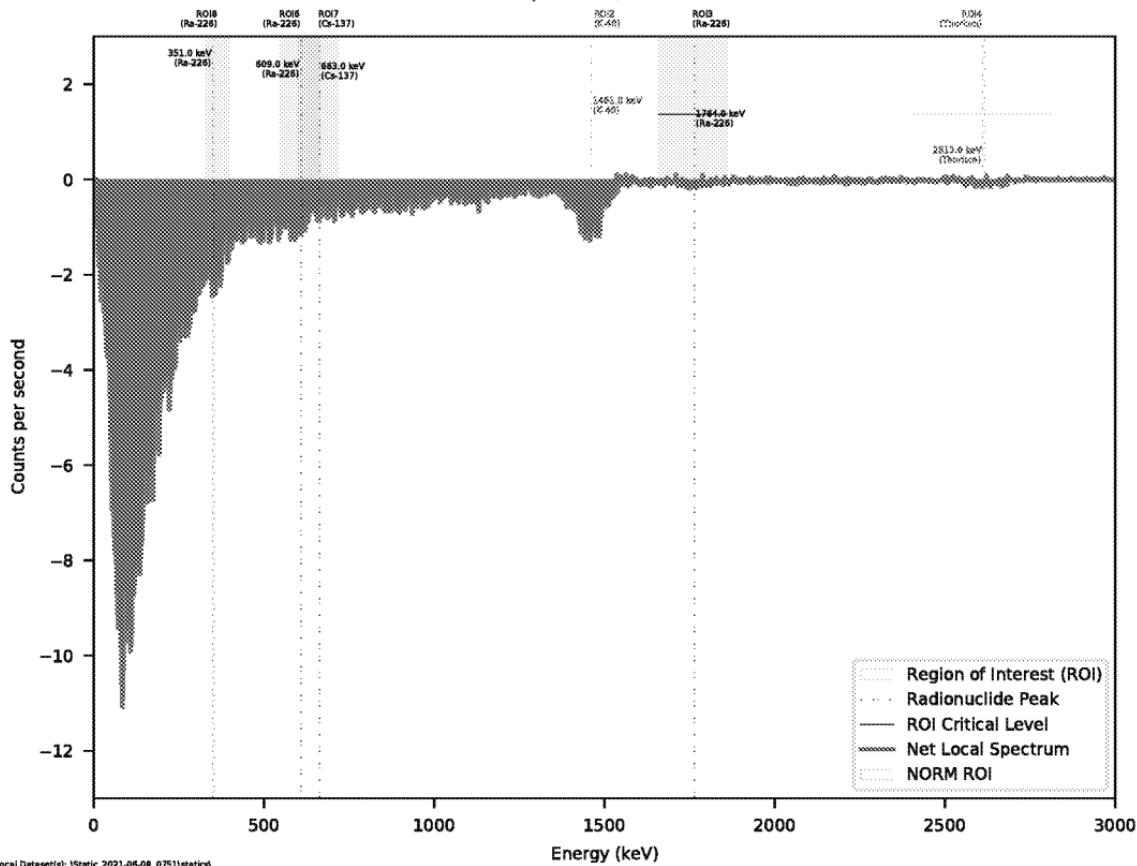


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36659224415786, 37.72311544736842

ED\_006360A\_00000162-00062

# Net Gamma Spectrum, Static Location: 50

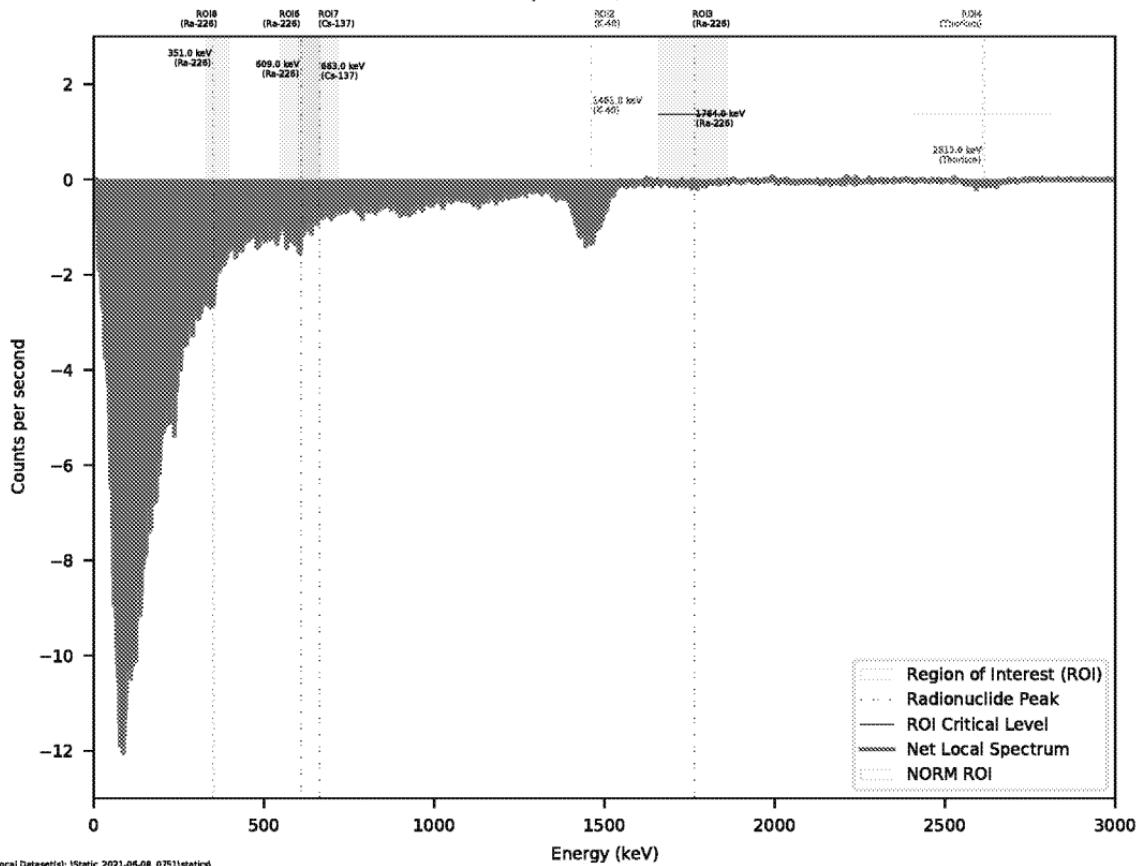


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3688231852777, 37.72302074999996

ED\_006360A\_00000162-00063

# Net Gamma Spectrum, Static Location: 51

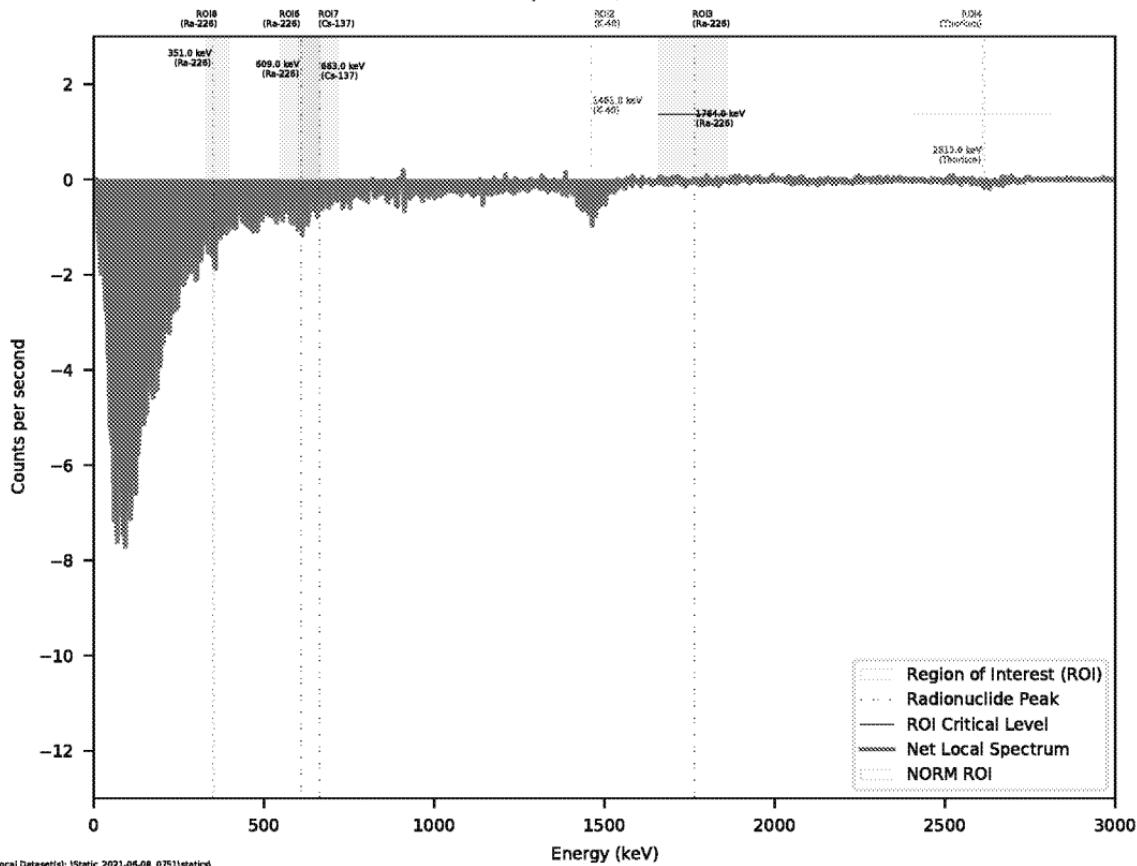


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSIG\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.38876705128052, 37.7230265831933

ED\_006360A\_00000162-00064

# Net Gamma Spectrum, Static Location: 52

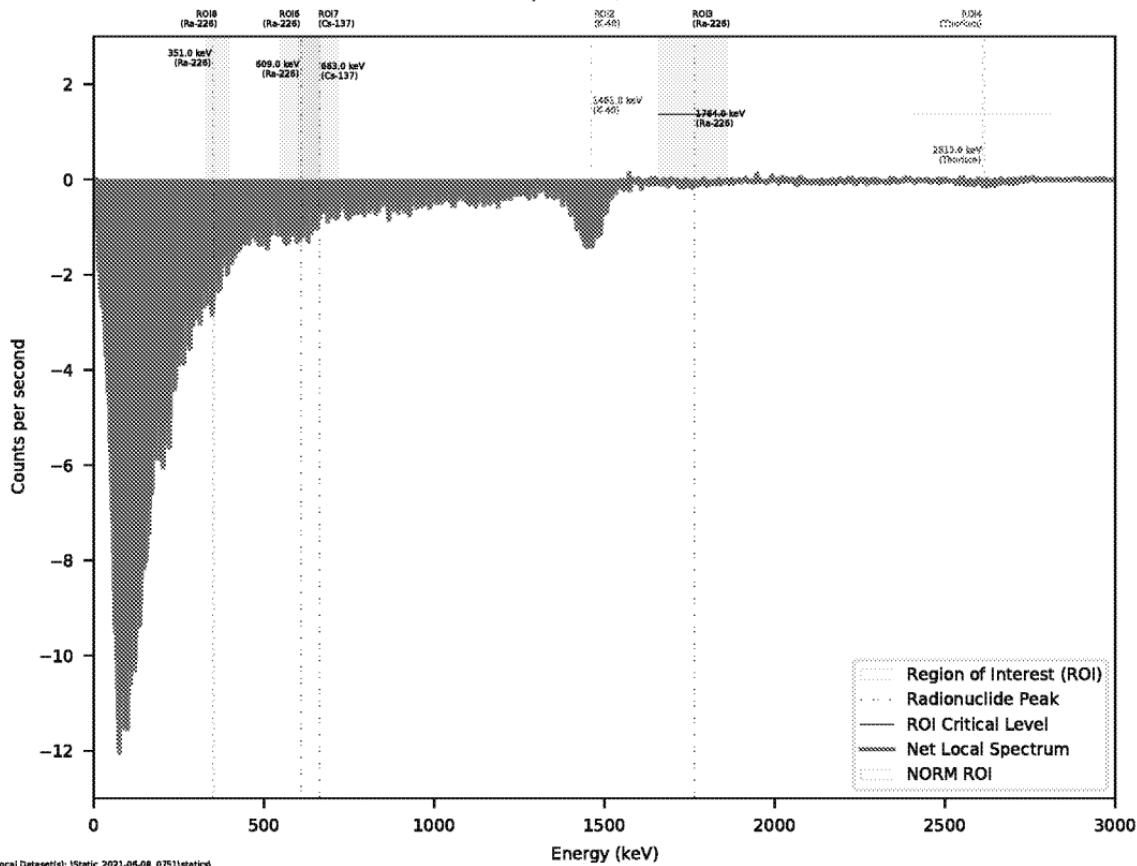


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36884781571428, 37.72999202857142

ED\_006360A\_00000162-00065

# Net Gamma Spectrum, Static Location: 53

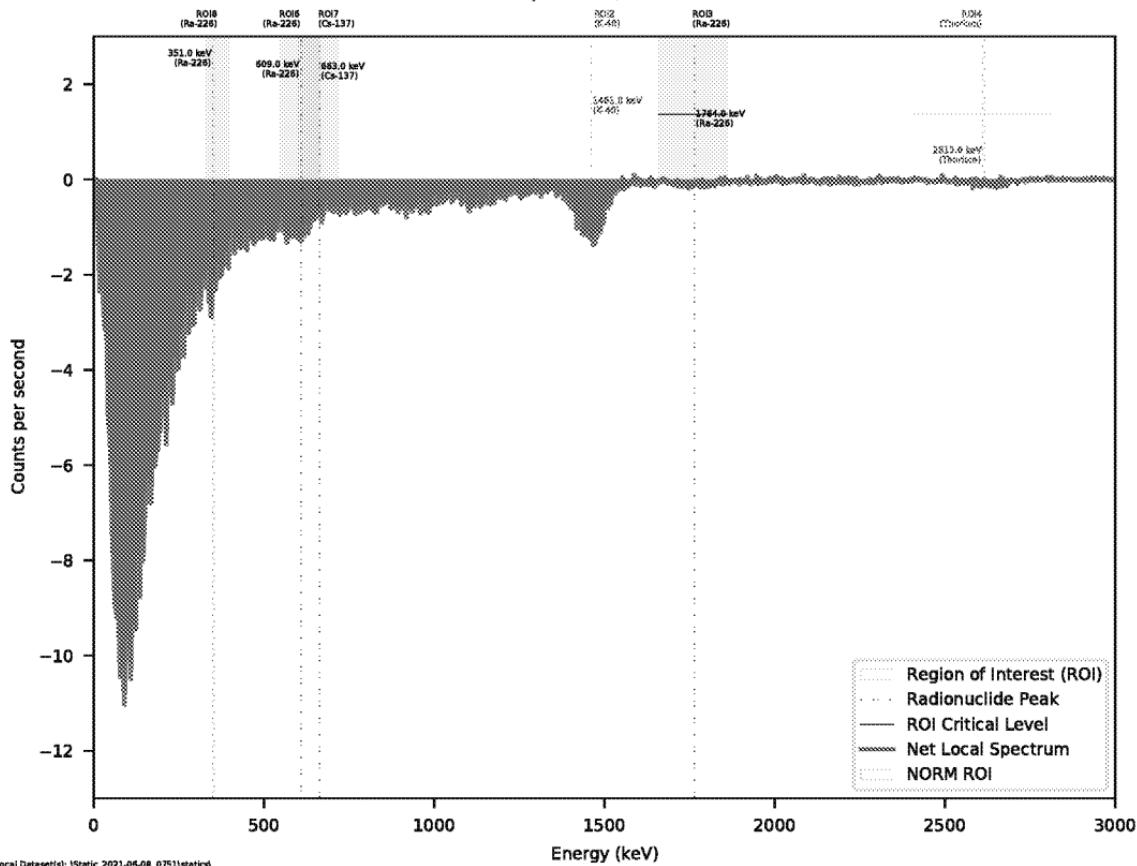


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3685883555556, 37.723083745833335

ED\_006360A\_00000162-00066

# Net Gamma Spectrum, Static Location: 54

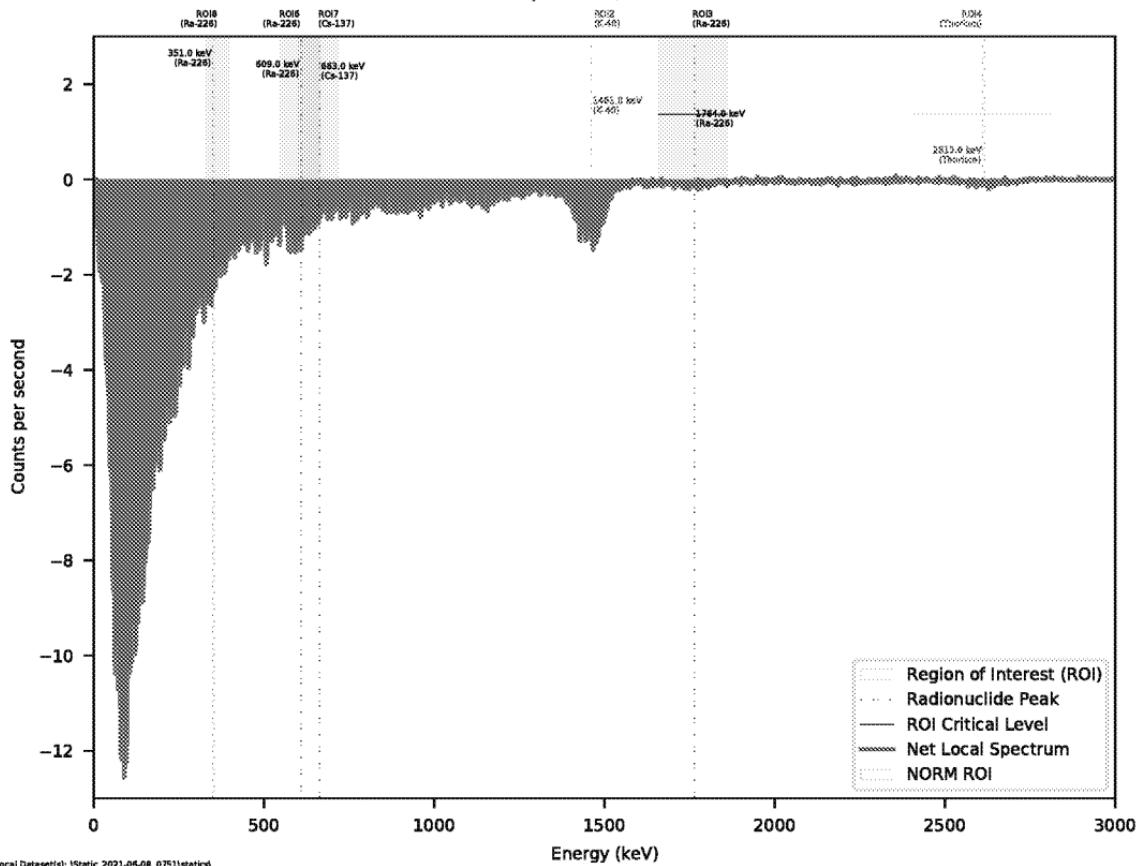


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36657886764707, 37.72313657205862

ED\_006360A\_00000162-00067

# Net Gamma Spectrum, Static Location: 55

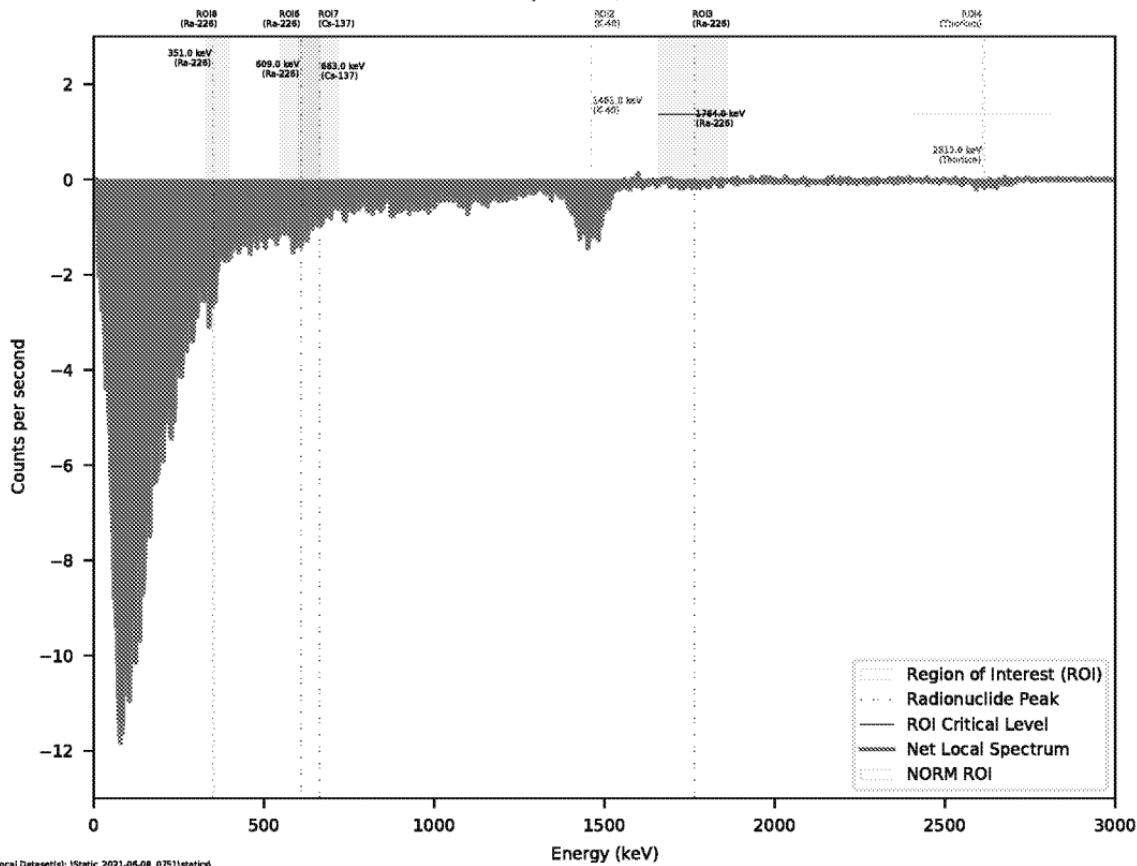


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36889403134329, 37.723077976119406

ED\_006360A\_00000162-00068

# Net Gamma Spectrum, Static Location: 56

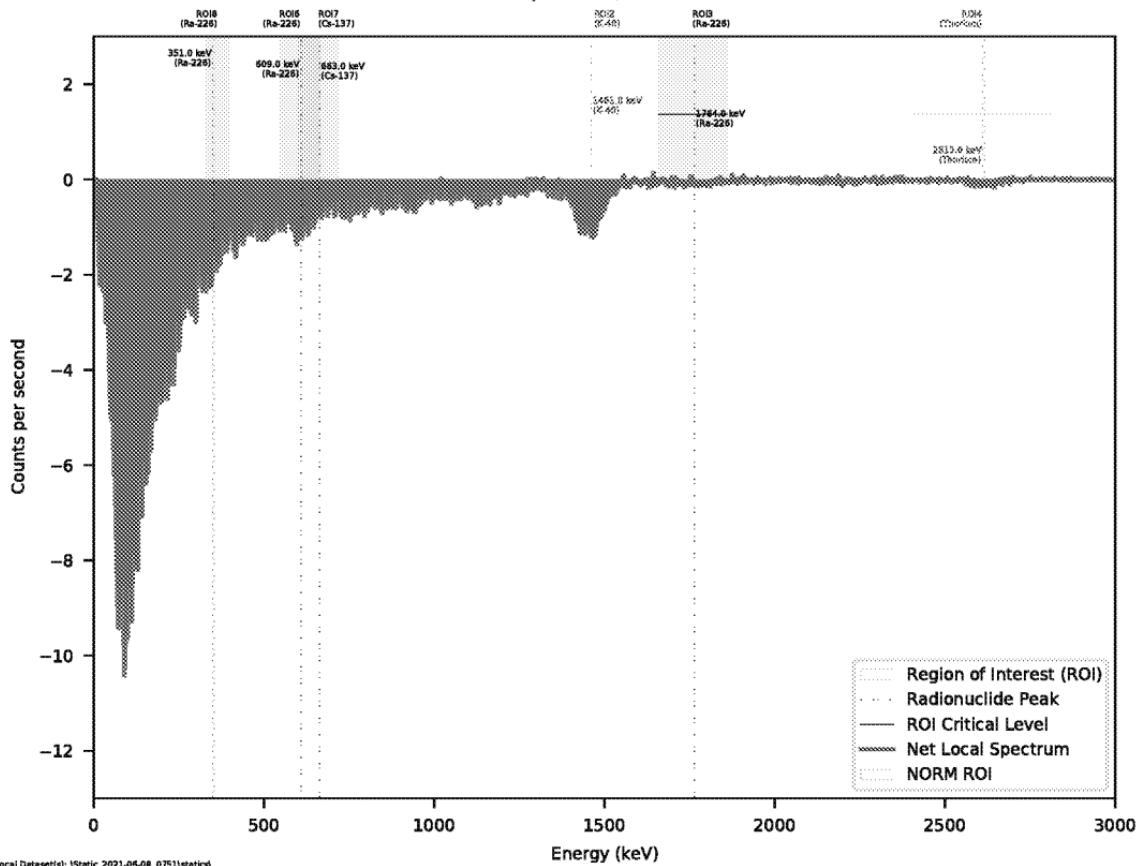


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36890238515151, 37.723063521212126

ED\_006360A\_00000162-00069

# Net Gamma Spectrum, Static Location: 57

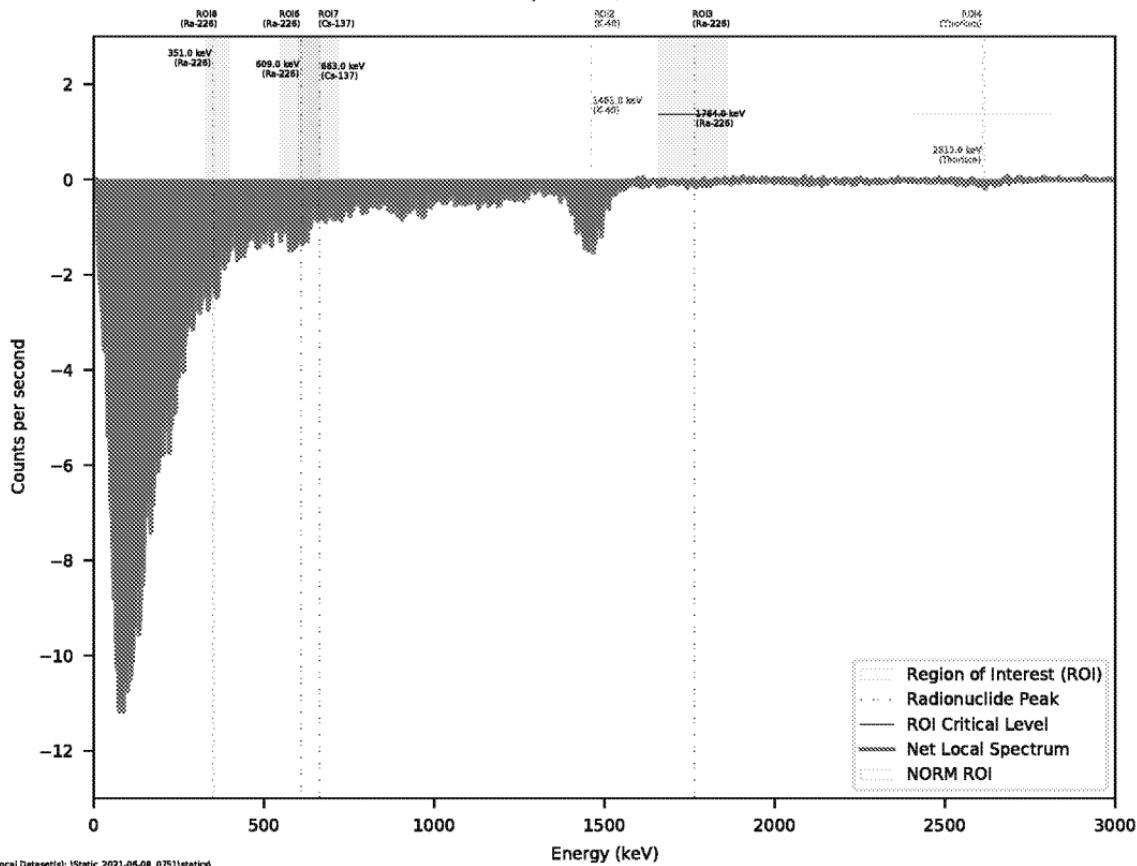


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36891582307694, 37.723021235384614

ED\_006360A\_00000162-00070

# Net Gamma Spectrum, Static Location: 58

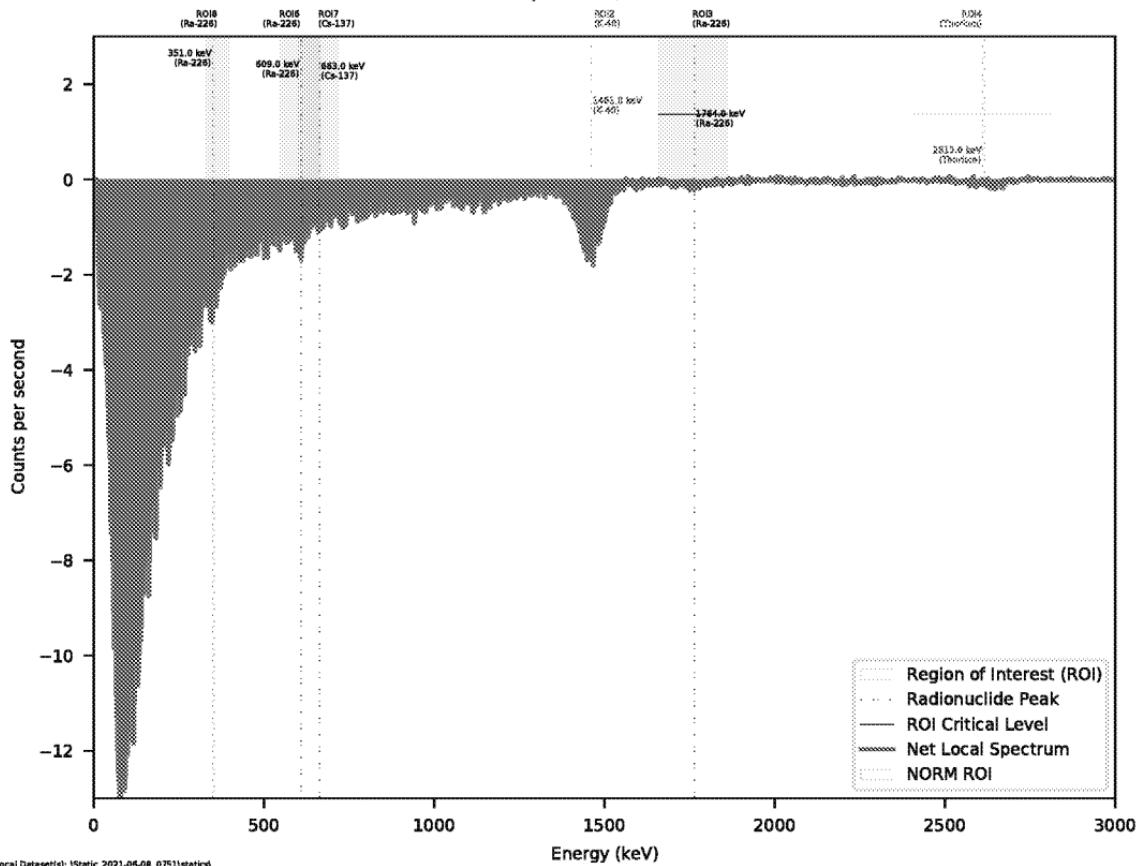


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.38873316911763, 37.7230644367647

ED\_006360A\_00000162-00071

# Net Gamma Spectrum, Static Location: 59

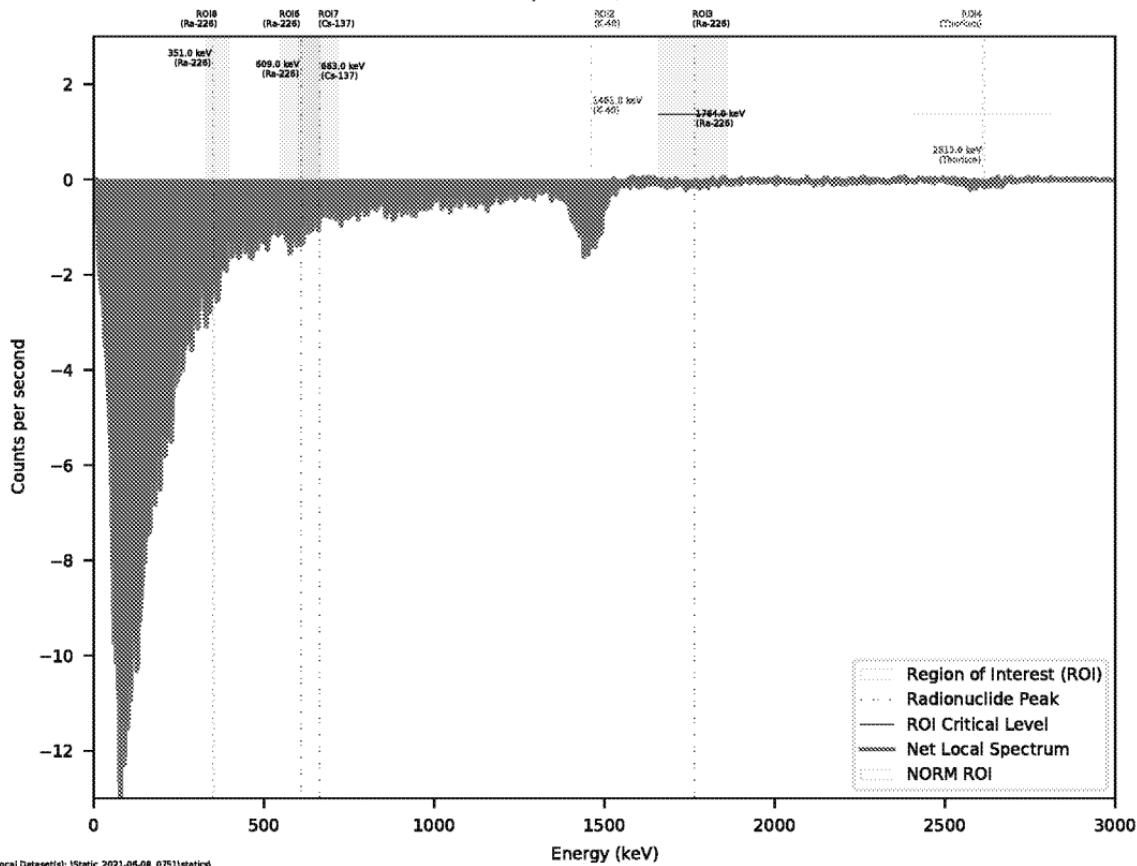


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3663202121212, 37.7231024590901

ED\_006360A\_00000162-00072

# Net Gamma Spectrum, Static Location: 60

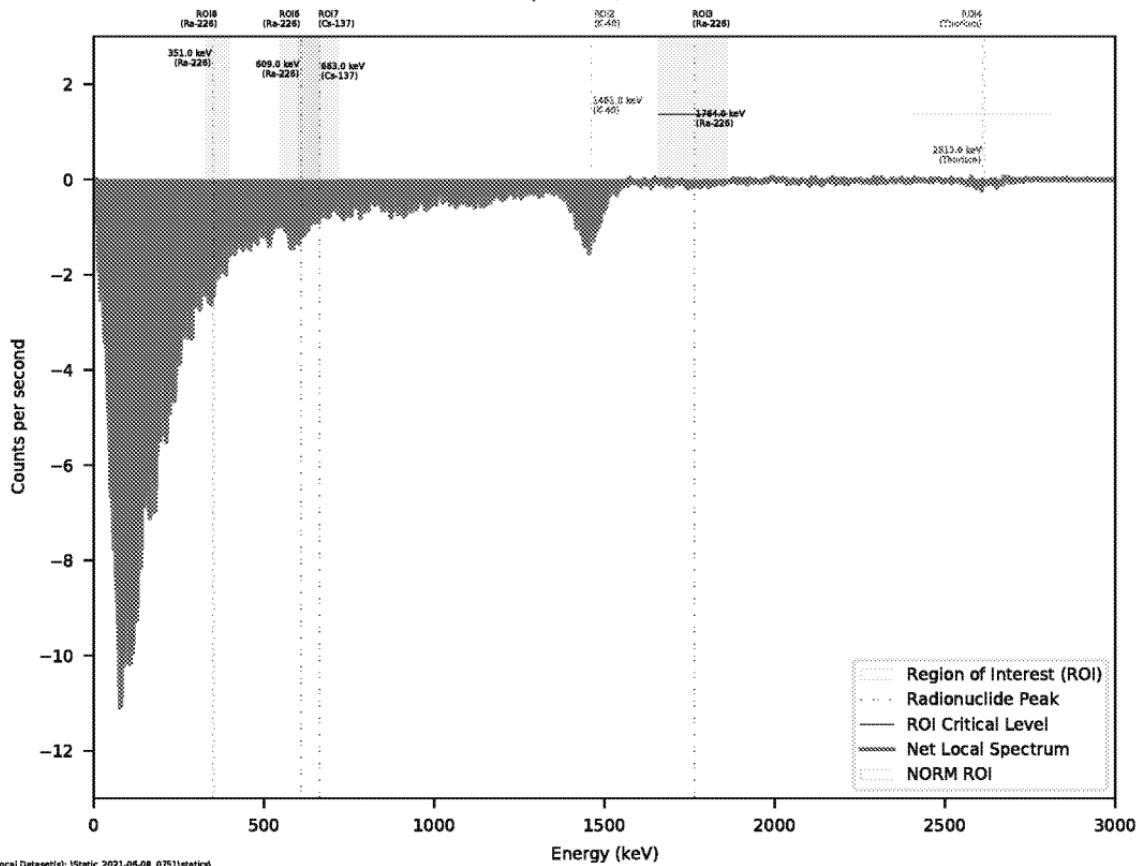


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3685344328125, 37.7230812809375

ED\_006360A\_00000162-00073

# Net Gamma Spectrum, Static Location: 61

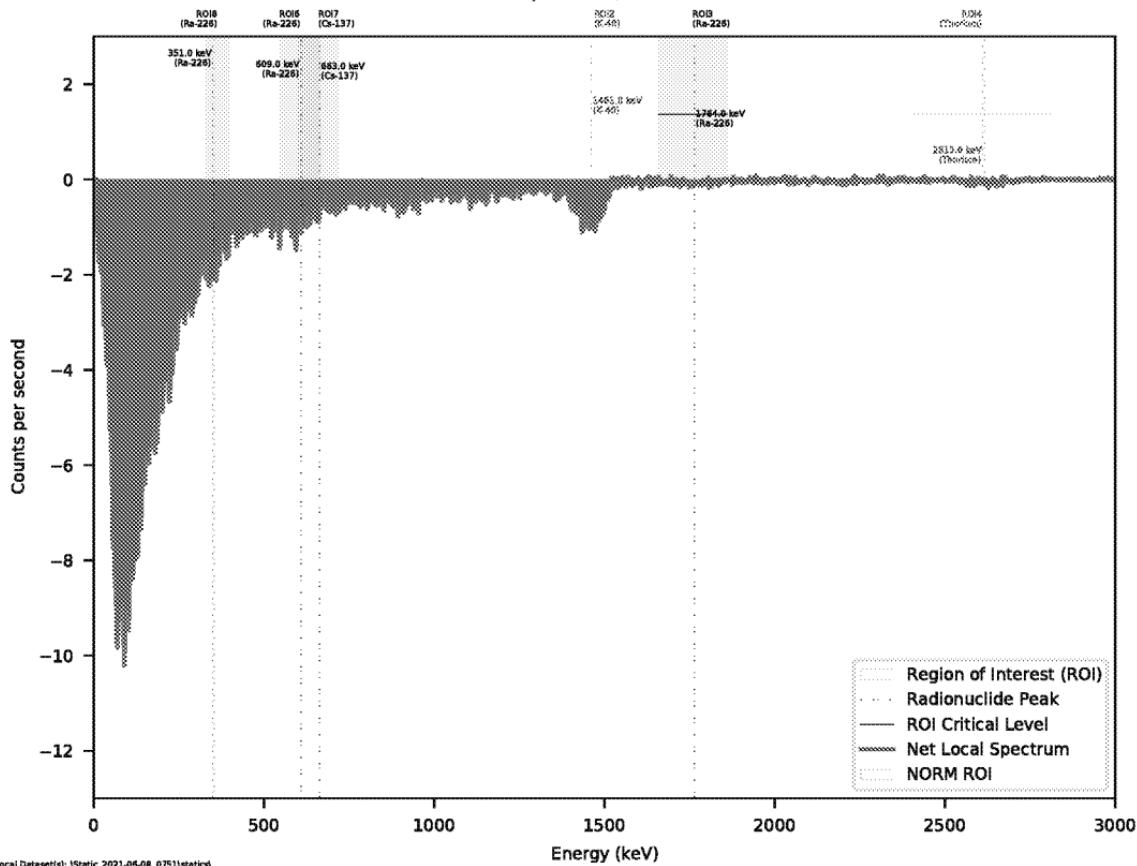


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36855191125001, 37.72305455125

ED\_006360A\_00000162-00074

## Net Gamma Spectrum, Static Location: 62

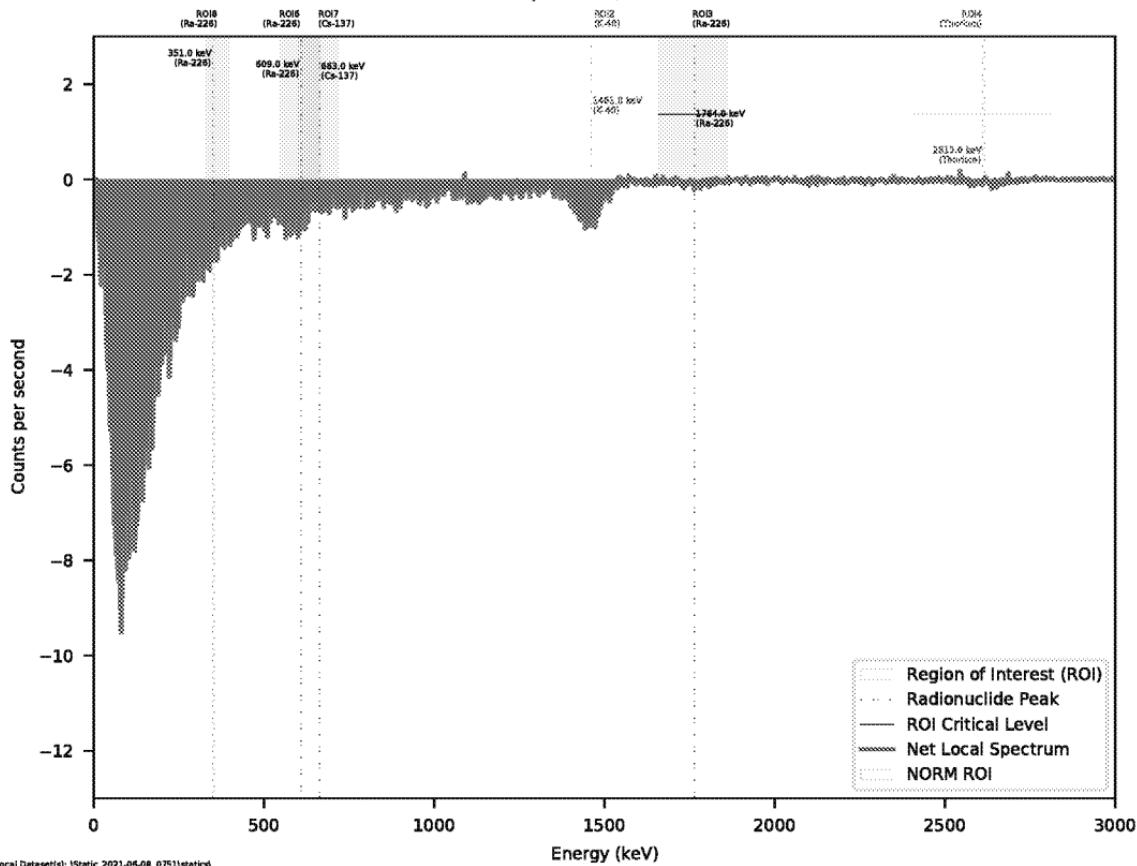


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3682278260869, 37.7298840434783

ED\_006360A\_00000162-00075

# Net Gamma Spectrum, Static Location: 63

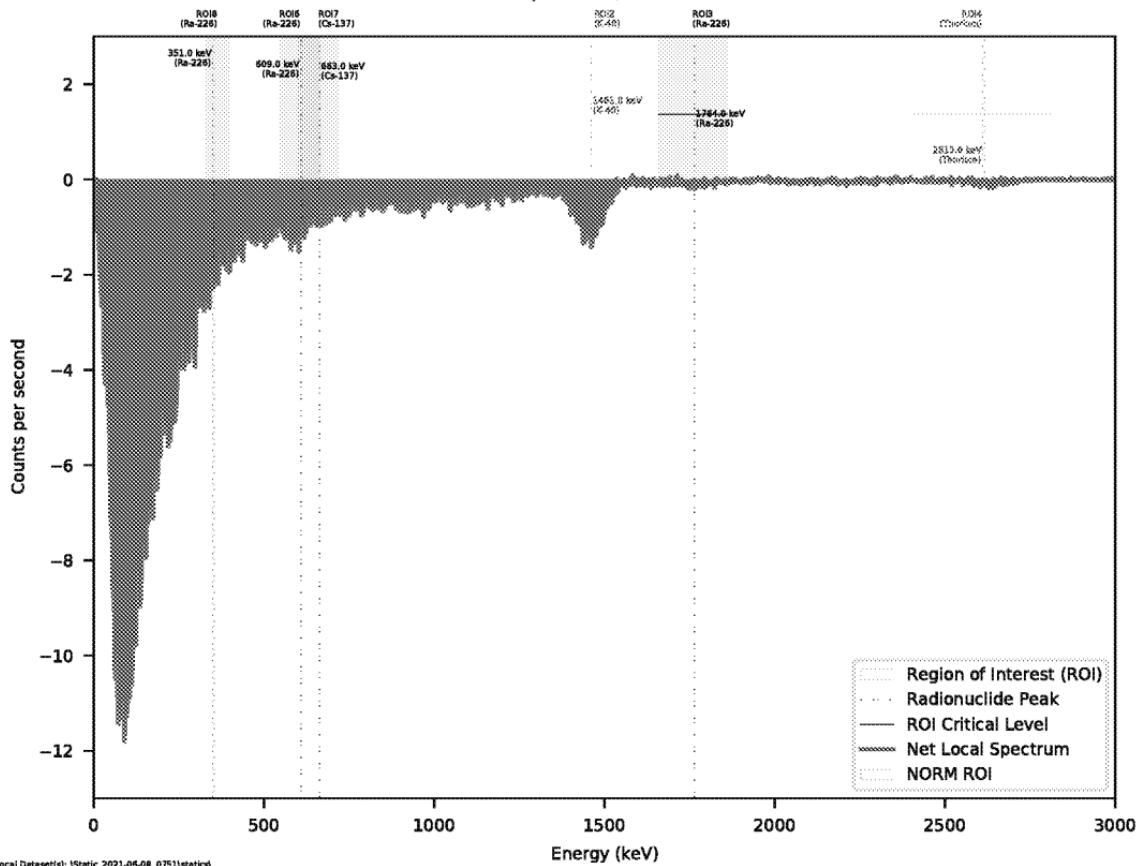


Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36881958769232, 37.72298238461534

ED\_006360A\_00000162-00076

# Net Gamma Spectrum, Static Location: 64

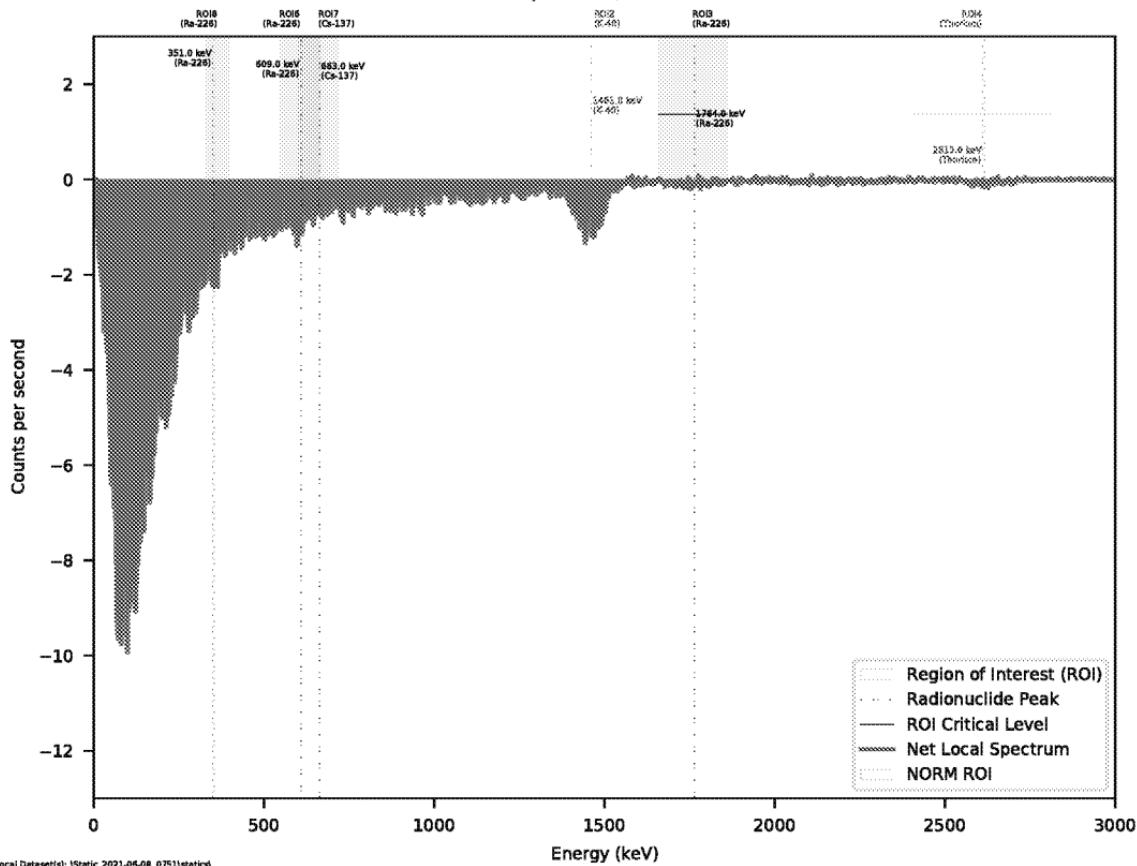


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSQ2\_SoilRBA\_Static.csv

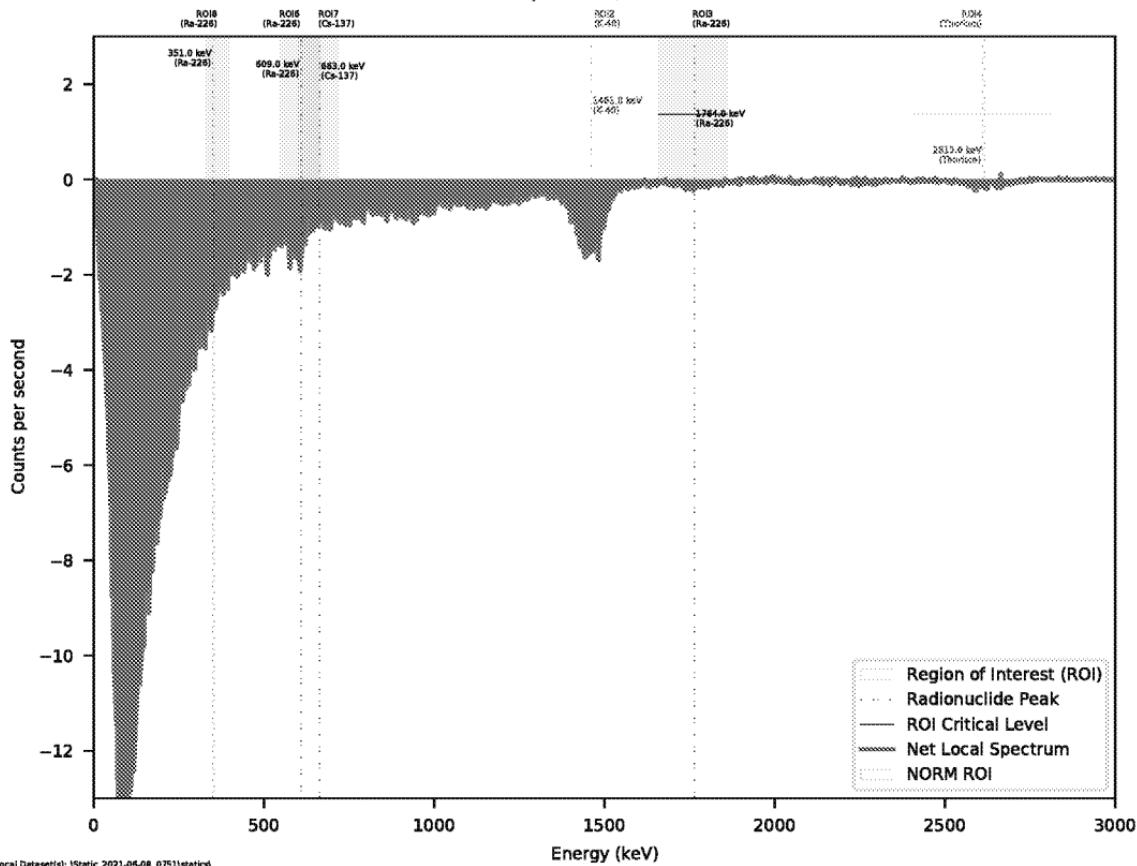
Local Coordinates (Longitude, Latitude): -122.3688211042857, 37.72299138571427

ED\_006360A\_00000162-00077

# Net Gamma Spectrum, Static Location: 65



# Net Gamma Spectrum, Static Location: 66

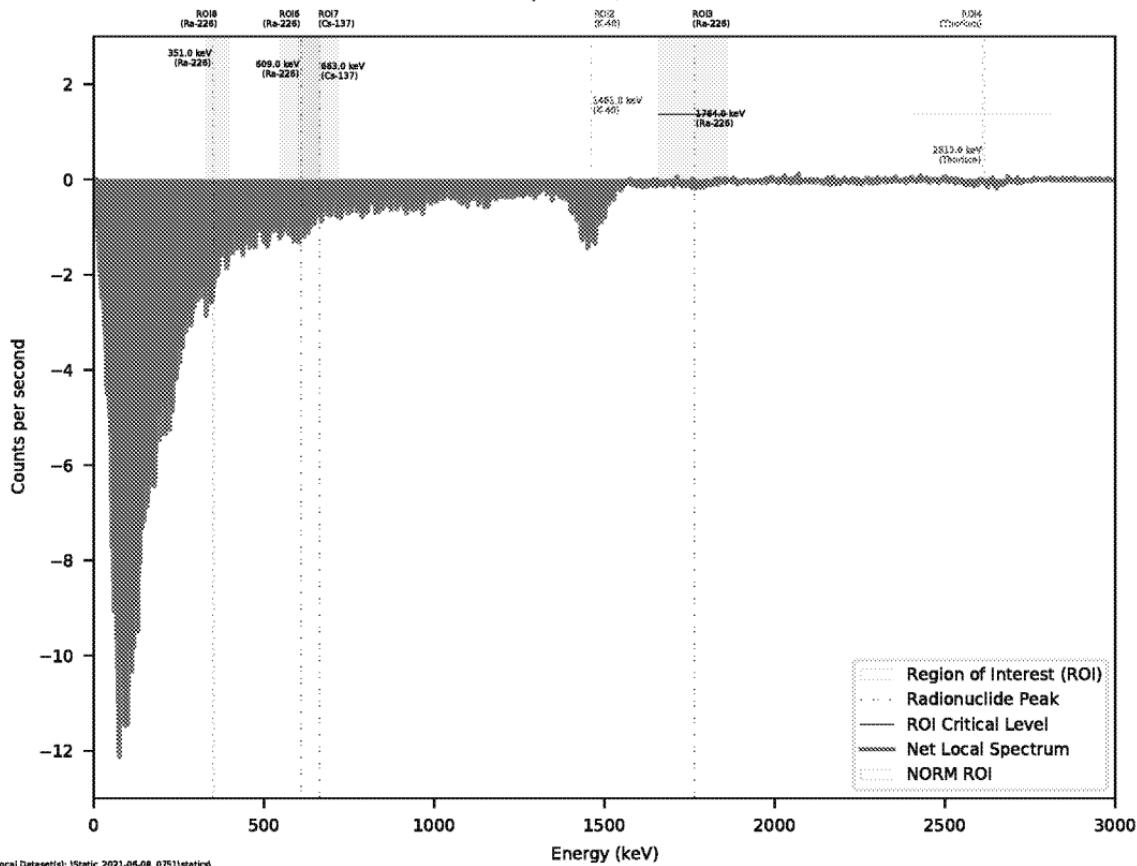


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSIG\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36881244552832, 37.72299783157895

ED\_006360A\_00000162-00079

# Net Gamma Spectrum, Static Location: 67

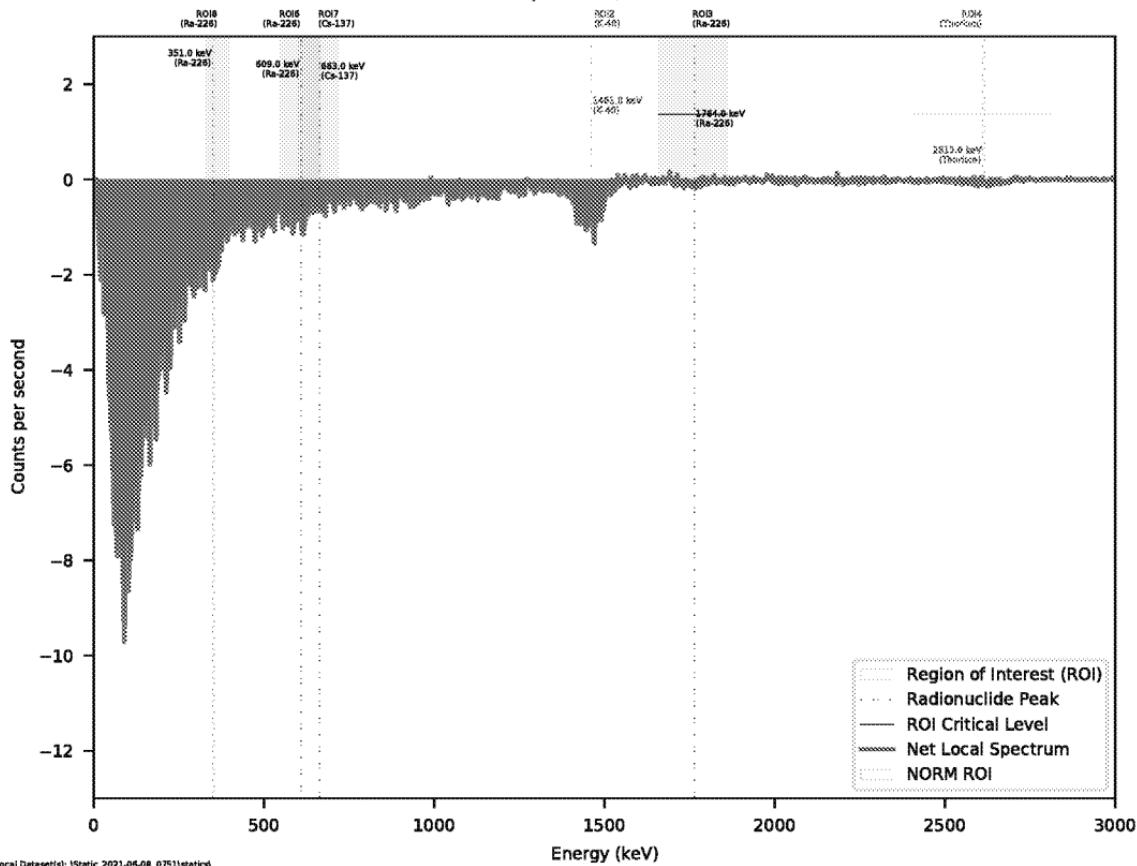


Local Dataset(s): lstatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.3688252153846, 37.72300142944718

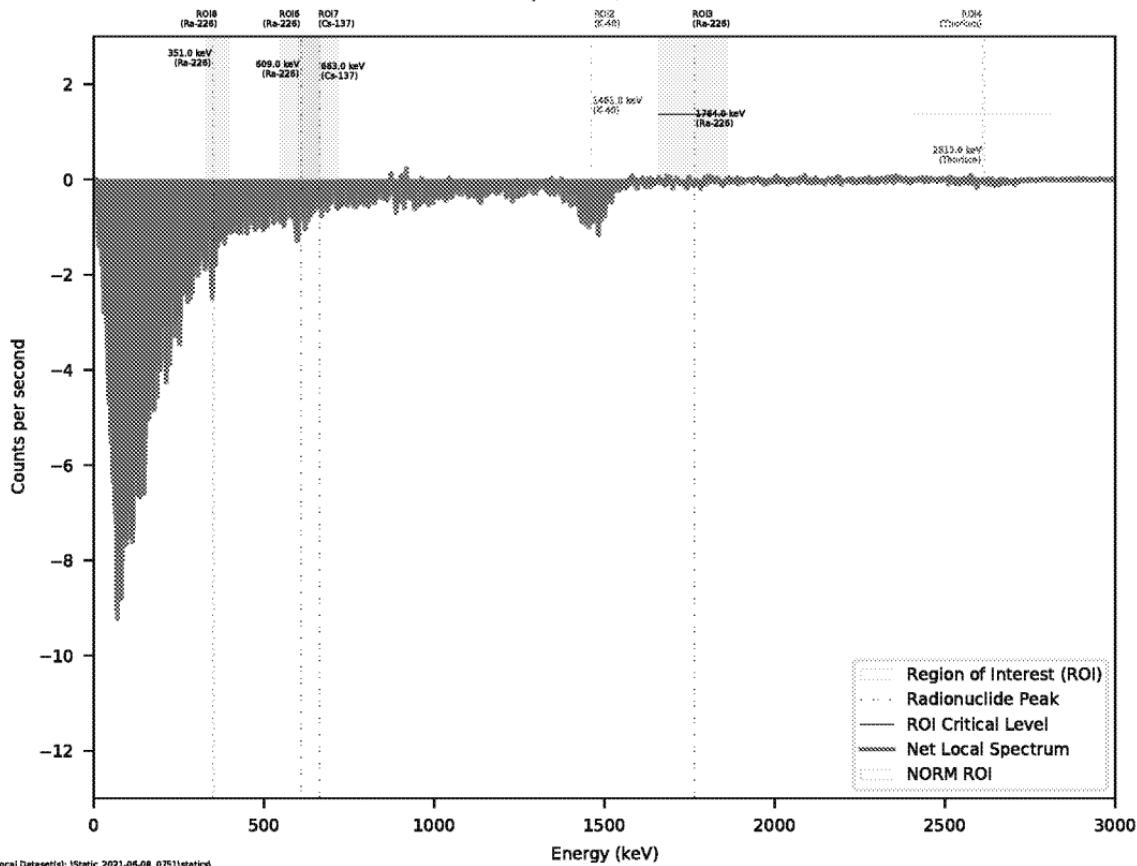
ED\_006360A\_00000162-00080

# Net Gamma Spectrum, Static Location: 68



ED\_006360A\_00000162-00081

# Net Gamma Spectrum, Static Location: 69



Local Dataset(s): lStatic\_2021-06-08\_0751\static  
Background Dataset(s): RSII\_SoilRBA\_Static.csv

Local Coordinates (Longitude, Latitude): -122.36889680606059, 37.722964915151515

ED\_006360A\_00000162-00082



Environment Testing  
America

## ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-42364-1  
Laboratory Sample Delivery Group: GJ46599762  
Client Project/Site: HPNS-Parcel G 501197

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

Authorized for release by:  
7/31/2021 10:26:07 AM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

### LINKS

Review your project  
results through

**Total Access**

Have a Question?

Ask—  
The  
Expert

Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Job ID: 160-42364-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

**Narrative**

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-42364-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 06/09/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at

# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Job ID: 160-42364-1 (Continued)

### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

receipt was 21.6 C.

#### STRONTIUM-90 (GFPC)

Samples HPPG-SFU-TU077A-001 (160-42364-3), HPPG-SFU-TU077A-011 (160-42364-13) and HPPG-SFU-TU077A-021 (160-42364-23) were analyzed for Strontium-90 (GFPC) in accordance with EPA 905. The samples were dried on 06/10/2021, prepared on 07/20/2021 and analyzed on 07/29/2021.

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-519394/23-A)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-F-065 (160-42364-1), HPPG-F-066 (160-42364-2), HPPG-SFU-TU077A-001 (160-42364-3), HPPG-SFU-TU077A-002 (160-42364-4), HPPG-SFU-TU077A-003 (160-42364-5), HPPG-SFU-TU077A-004 (160-42364-6), HPPG-SFU-TU077A-005 (160-42364-7), HPPG-SFU-TU077A-006 (160-42364-8), HPPG-SFU-TU077A-007 (160-42364-9), HPPG-SFU-TU077A-008 (160-42364-10), HPPG-SFU-TU077A-009 (160-42364-11), HPPG-SFU-TU077A-010 (160-42364-12), HPPG-SFU-TU077A-011 (160-42364-13), HPPG-SFU-TU077A-012 (160-42364-14), HPPG-SFU-TU077A-013 (160-42364-15), HPPG-SFU-TU077A-014 (160-42364-16), HPPG-SFU-TU077A-015 (160-42364-17), HPPG-SFU-TU077A-016 (160-42364-18), HPPG-SFU-TU077A-017 (160-42364-19), HPPG-SFU-TU077A-018 (160-42364-20), HPPG-SFU-TU077A-019 (160-42364-21), HPPG-SFU-TU077A-020 (160-42364-22), HPPG-SFU-TU077A-021 (160-42364-23), HPPG-SFU-TU077A-022 (160-42364-24), HPPG-SFU-TU077A-023 (160-42364-25), HPPG-SFU-TU077A-024 (160-42364-26) and HPPG-SFU-TU077A-025 (160-42364-27) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 06/10/2021, prepared on 06/14/2021 and analyzed on 07/05/2021, 07/06/2021 and 07/07/2021.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

#### Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

Gamma prep batch 514265

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-514265/1-A)

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

## Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

### Job ID: 160-42364-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

HPPG-SFU-TU077A-013 (160-42364-15)

Gamma prep batch 514243

The Radium-226 MDC (DLC) of 0.269 pCi/g for the method blank (MB) is above the requested limit of 0.200 pCi/g. Ra-226 activity was not observed in the MB above the MDC or RL. The MDC for the associated samples is less than the requested limit. The data have been reported with the MDC achieved. (MB 160-514243/1-A)

The MB z-score for Ti-208 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances.(MB 160-514243/1-A)

Gamma prep batch 514236

The method blank (MB) z-score associated is within limits and is stored in the level IV raw data. (MB 160-514236/1-A)

The Cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

HPPG-SFU-TU077A-002 (160-42364-4) and HPPG-SFU-TU077A-007 (160-42364-9)

The Cesium-137 detection goal of 0.0700 pCi/g and Radium-226 detection goal of 0.200 pCi/g were not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline. HPPG-SFU-TU077A-003 (160-42364-5)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.





# CHAIN OF CUSTODY

Ref. Document # 501197RSY-062

Page 2 of 4

APTIM Federal Services, LLC  
4005 Port Chicago Hwy  
Concord, CA 94520

Project Manager: Lisa Bercik  
Phone #: (619)213-3389

Send Report to: Rose Condit  
Phone/Fax Number: 415-987-0160  
Address: 4005 Port Chicago Hwy  
City: Concord, CA 94520

Sample Lead: Rizzo, Trevor  
Sample Tech(s): John Naumann  
Doug Mallory

Analysis Requested						
Strontium-90 (EPA 905 M0D)						
Germma Spec (EPA 901.1 M) - Fall 21						
Project Number:	501197	Hunters Point Naval Shipyard: Parcel				
Project Name:	G Remedial Action					
Project Location:	San Francisco, CA					
Purchase Order #:	1158058					
Shipment/Pickup Date:	6/8/2021					
Waybill Number:	4957 0225 9250					
Test America (St. Louis Lab)						
Lab Destination:	13715 Rider Trail North Earth City, MO 63046					
Lab Contact Name/ph #	Rhoeda Ridenbower (314)298-8566					
Preservatives (water)						
Collection Information						
Sample ID	Date	Time	Method	Matrix	# of Containers	Container Type
HPPG-SFU-TU077A-007	6/8/2021	09:18	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-008	6/8/2021	09:19	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-009	6/8/2021	09:30	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-010	6/8/2021	09:37	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-011	6/8/2021	09:07	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-012	6/8/2021	09:20	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-013	6/8/2021	09:37	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-014	6/8/2021	08:47	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-015	6/8/2021	09:29	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-016	6/8/2021	09:51	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-017	6/8/2021	09:21	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-018	6/8/2021	09:47	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-019	6/8/2021	09:47	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-020	6/8/2021	10:03	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-021	6/8/2021	09:58	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-022	6/8/2021	10:08	G	SO	1	16 oz. plastic jar
HPPG-SFU-TU077A-023	6/8/2021	10:10	G	SO	1	16 oz. plastic jar

1  
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# CHAIN OF CUSTODY

Ref. Document # 501197RSY-062

Page 3 of 4

APTIM Federal Services, LLC  
4005 Port Chicago Hwy  
Concord, CA 94520

Project Number: 501197  
Project Name: G Remedial Action  
Hunters Point Naval Shipyard: Parcel

Project Manager: Lisa Bercik  
Phone #: (619)213-3389

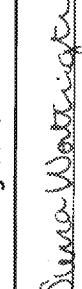
Send Report to: Rose Condit  
Phone/Fax Number: 415.987.70760  
Address: 4005 Port Chicago Hwy  
Concord, CA 94520

Sample Lead: Rizzo, Trevor  
Sample Tech(s): John Naumann  
Doug Mallory

Analysis Requested							
					Dose Rate	Evidence Bag ID	Comment
					uR/Hr		
		Strontium-90 (EPA 905 M0D)					
Gamma Spec (EPA 901.1 M) - Full 21 day in growth gamma							
Waybill Number:	495702364250	Matrx	# of Containers	Preservatives (water)	Preservatives (soil)		
Lab Destination:	Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046						
Lab Contact Name/ph #	Rhoeda Ridentower (314)298-8566						
Collection Information	Date	Time	Method	Container Type			
Sample ID							
HPPG-SFU-TU077A-024	6/8/2021	10:14	G	SO	1	16 oz. plastic jar	X
HPPG-SFU-TU077A-025	6/8/2021	10:20	G	SO	1	16 oz. plastic jar	X

# All Transfers for COC 501197RSY-062

Page 4 of 4

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Rizzo, Trevor		06/08/2021 16:11	SHIPPEDTOLAB		06/09/2021 14:10



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42364-1

SDG Number: GJ46599762

**Login Number:** 42364

**List Source:** Eurofins TestAmerica, St. Louis

**List Number:** 1

**Creator:** Worthington, Sierra M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

## Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

Method	Method Description	Protocol	Laboratory
905	Strontium-90 (GFPC)	EPA	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-7	Preparation, Digestion/Precipitate Separation (7-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

**Protocol References:**

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

**Laboratory References:**

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-42364-1	HPPG-F-065	Solid	06/08/21 09:37	06/09/21 14:10
160-42364-2	HPPG-F-066	Solid	06/08/21 09:29	06/09/21 14:10
160-42364-3	HPPG-SFU-TU077A-001	Solid	06/08/21 08:47	06/09/21 14:10
160-42364-4	HPPG-SFU-TU077A-002	Solid	06/08/21 08:51	06/09/21 14:10
160-42364-5	HPPG-SFU-TU077A-003	Solid	06/08/21 08:58	06/09/21 14:10
160-42364-6	HPPG-SFU-TU077A-004	Solid	06/08/21 09:00	06/09/21 14:10
160-42364-7	HPPG-SFU-TU077A-005	Solid	06/08/21 09:10	06/09/21 14:10
160-42364-8	HPPG-SFU-TU077A-006	Solid	06/08/21 09:08	06/09/21 14:10
160-42364-9	HPPG-SFU-TU077A-007	Solid	06/08/21 09:18	06/09/21 14:10
160-42364-10	HPPG-SFU-TU077A-008	Solid	06/08/21 09:19	06/09/21 14:10
160-42364-11	HPPG-SFU-TU077A-009	Solid	06/08/21 09:30	06/09/21 14:10
160-42364-12	HPPG-SFU-TU077A-010	Solid	06/08/21 09:37	06/09/21 14:10
160-42364-13	HPPG-SFU-TU077A-011	Solid	06/08/21 09:07	06/09/21 14:10
160-42364-14	HPPG-SFU-TU077A-012	Solid	06/08/21 09:20	06/09/21 14:10
160-42364-15	HPPG-SFU-TU077A-013	Solid	06/08/21 09:37	06/09/21 14:10
160-42364-16	HPPG-SFU-TU077A-014	Solid	06/08/21 08:47	06/09/21 14:10
160-42364-17	HPPG-SFU-TU077A-015	Solid	06/08/21 09:29	06/09/21 14:10
160-42364-18	HPPG-SFU-TU077A-016	Solid	06/08/21 09:51	06/09/21 14:10
160-42364-19	HPPG-SFU-TU077A-017	Solid	06/08/21 09:21	06/09/21 14:10
160-42364-20	HPPG-SFU-TU077A-018	Solid	06/08/21 09:47	06/09/21 14:10
160-42364-21	HPPG-SFU-TU077A-019	Solid	06/08/21 09:47	06/09/21 14:10
160-42364-22	HPPG-SFU-TU077A-020	Solid	06/08/21 10:03	06/09/21 14:10
160-42364-23	HPPG-SFU-TU077A-021	Solid	06/08/21 09:58	06/09/21 14:10
160-42364-24	HPPG-SFU-TU077A-022	Solid	06/08/21 10:08	06/09/21 14:10
160-42364-25	HPPG-SFU-TU077A-023	Solid	06/08/21 10:10	06/09/21 14:10
160-42364-26	HPPG-SFU-TU077A-024	Solid	06/08/21 10:14	06/09/21 14:10
160-42364-27	HPPG-SFU-TU077A-025	Solid	06/08/21 10:20	06/09/21 14:10

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-F-065**

Date Collected: 06/08/21 09:37

Date Received: 06/09/21 14:10

**Lab Sample ID: 160-42364-1**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.281		0.138	0.141		0.166	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Actinium-227	0.186	U	0.354	0.354		0.307	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Americium-241	0.0648	U	0.148	0.148		0.119	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Bismuth-212	0.000	U	0.466	0.466		0.689	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Bismuth-214</b>	<b>0.559</b>		0.134	0.146		0.0464	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Cesium-137	0.00214	U	0.0518	0.0518	0.0700	0.0425	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Lead-210	-0.798	U	1.48	1.48		1.18	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Lead-212</b>	<b>0.452</b>		0.0840	0.102		0.0322	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Lead-214</b>	<b>0.503</b>		0.108	0.120		0.0333	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Potassium-40</b>	<b>7.42</b>		1.25	1.46		0.310	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Protactinium-231	0.000	U	0.878	0.878		2.10	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Protactinium-234	0.0564	U	0.226	0.226		0.184	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Radium-226</b>	<b>0.559</b>		0.134	0.146	0.200	0.0464	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Radium-228</b>	<b>0.281</b>		0.138	0.141		0.166	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Thallium-208</b>	<b>0.154</b>		0.0670	0.0689		0.0411	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Thorium 228</b>	<b>0.452</b>		0.0840	0.102		0.0322	pCi/g	06/14/21 12:36	07/05/21 09:43	1
<b>Thorium-232</b>	<b>0.281</b>		0.138	0.141		0.166	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Thorium-234	0.0226	U	0.0456	0.0457		0.939	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Uranium-235	0.180	U	0.362	0.363		0.395	pCi/g	06/14/21 12:36	07/05/21 09:43	1
Uranium-238	0.0226	U	0.0456	0.0457		0.939	pCi/g	06/14/21 12:36	07/05/21 09:43	1

**Client Sample ID: HPPG-F-066**

Date Collected: 06/08/21 09:29

Date Received: 06/09/21 14:10

**Lab Sample ID: 160-42364-2**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.483		0.159	0.166		0.0602	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Actinium-227	0.0572	U	0.582	0.583		0.344	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Americium-241	0.0635	U	0.145	0.145		0.117	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Bismuth-212	0.000	U	0.395	0.395		0.341	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Bismuth-214</b>	<b>0.288</b>		0.101	0.105		0.0437	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Cesium-137	0.00616	U	0.0469	0.0469	0.0700	0.0380	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Lead-210	0.174	U	1.50	1.50		1.23	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Lead-212</b>	<b>0.393</b>		0.0824	0.0968		0.0383	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Lead-214</b>	<b>0.353</b>		0.0943	0.101		0.0405	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Potassium-40</b>	<b>6.72</b>		1.17	1.36		0.298	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Protactinium-231	0.000	U	0.735	0.735		2.03	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Protactinium-234	-0.0968	U	0.277	0.277		0.225	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Radium-226</b>	<b>0.288</b>		0.101	0.105	0.200	0.0437	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Radium-228</b>	<b>0.483</b>		0.159	0.166		0.0602	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Thallium-208</b>	<b>0.124</b>		0.0402	0.0422		0.0118	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Thorium 228</b>	<b>0.393</b>		0.0824	0.0968		0.0383	pCi/g	06/14/21 12:36	07/07/21 17:50	1
<b>Thorium-232</b>	<b>0.483</b>		0.159	0.166		0.0602	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Thorium-234	0.0284	U	0.0591	0.0592		0.864	pCi/g	06/14/21 12:36	07/07/21 17:50	1
Uranium-235	0.000	U	0.146	0.146		0.383	pCi/g	06/14/21 12:36	07/07/21 17:50	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Client Sample ID: HPPG-F-066**

**Lab Sample ID: 160-42364-2**

Date Collected: 06/08/21 09:29

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.0284	U	0.0591	0.0592		0.864	pCi/g	06/14/21 12:36	07/07/21 17:50	1

**Client Sample ID: HPPG-SFU-TU077A-001**

**Lab Sample ID: 160-42364-3**

Date Collected: 06/08/21 08:47

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.111	U	0.150	0.151	0.331	0.114	pCi/g	07/20/21 12:00	07/29/21 14:06	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	90.4		40 - 110					07/20/21 12:00	07/29/21 14:06	1
Y Carrier	92.6		40 - 110					07/20/21 12:00	07/29/21 14:06	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.625		0.140	0.154		0.0577	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Actinium-227	0.166	U	0.347	0.347		0.323	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Americium-241	0.0183	U	0.126	0.126		0.103	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Bismuth-212	-0.228	U	0.694	0.695		0.553	pCi/g	06/14/21 12:36	07/05/21 09:45	1
<b>Bismuth-214</b>	<b>0.530</b>		0.111	0.124		0.0339	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Cesium-137	0.00750	U	0.0379	0.0379	0.0700	0.0303	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Lead-210	0.316	U	1.44	1.44		1.17	pCi/g	06/14/21 12:36	07/05/21 09:45	1
<b>Lead-212</b>	<b>0.533</b>		0.0884	0.112		0.0378	pCi/g	06/14/21 12:36	07/05/21 09:45	1
<b>Lead-214</b>	<b>0.528</b>		0.0989	0.113		0.0426	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Potassium-40	8.17		1.17	1.44		0.0972	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Protactinium-231	0.000	U	0.720	0.720		2.01	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Protactinium-234	0.0892	U	0.0790	0.0796		0.232	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Radium-226	0.530		0.111	0.124	0.200	0.0339	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Radium-228	0.625		0.140	0.154		0.0577	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thallium-208	0.147		0.0451	0.0476		0.0151	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thorium 228	0.533		0.0884	0.112		0.0378	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thorium-232	0.625		0.140	0.154		0.0577	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thorium-234	0.418		0.391	0.393		0.313	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Uranium-235	-0.174	U	0.482	0.483		0.393	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Uranium-238	0.418		0.391	0.393		0.313	pCi/g	06/14/21 12:36	07/05/21 09:45	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-002**

**Lab Sample ID: 160-42364-4**

Date Collected: 06/08/21 08:51  
Date Received: 06/09/21 14:10

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.379		0.278	0.280		0.116	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Actinium-227	0.401		0.365	0.368		0.254	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Americium-241	0.0346	U	0.160	0.160		0.110	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Bismuth-212	-0.0246	U	1.08	1.08		0.832	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Bismuth-214	0.403		0.187	0.192		0.112	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Cesium-137	-0.0564	U	0.100	0.100	0.0700	0.0852	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Lead-210	1.07		1.60	1.60		0.968	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Lead-212	0.491		0.112	0.129		0.0448	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Lead-214	0.553		0.139	0.150		0.0601	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Potassium-40	8.13		1.77	1.95		0.353	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Protactinium-231	0.000	U	0.358	0.358		2.51	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Protactinium-234	-0.0503	U	0.141	0.141		0.255	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Radium-226	0.403		0.187	0.192	0.200	0.112	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Radium-228	0.379		0.278	0.280		0.116	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Thallium-208	0.142		0.0805	0.0818		0.0363	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Thorium 228	0.491		0.112	0.129		0.0448	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Thorium-232	0.379		0.278	0.280		0.116	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Thorium-234	0.149	U	0.324	0.324		0.910	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Uranium-235	0.114	U	0.350	0.350		0.281	pCi/g	06/14/21 12:36	07/06/21 20:58	1
Uranium-238	0.149	U	0.324	0.324		0.910	pCi/g	06/14/21 12:36	07/06/21 20:58	1

**Client Sample ID: HPPG-SFU-TU077A-003**

**Lab Sample ID: 160-42364-5**

Date Collected: 06/08/21 08:58  
Date Received: 06/09/21 14:10

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.401		0.206	0.210		0.136	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Actinium-227	-0.309	U	0.737	0.738		0.445	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Americium-241	-0.0431	U	0.156	0.156		0.172	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Bismuth-212	0.000	U	0.429	0.429		0.707	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Bismuth-214	0.133	U	0.116	0.117		0.209	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Cesium-137	0.0120	U	0.0879	0.0879	0.0700	0.0714	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Lead-210	2.12		1.82	1.84		1.09	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Lead-212	0.437		0.110	0.124		0.0584	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Lead-214	0.412		0.139	0.146		0.0644	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Potassium-40	6.09		1.31	1.45		0.379	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Protactinium-231	0.000	U	1.03	1.03		2.52	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Protactinium-234	-0.120	U	0.393	0.393		0.320	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Radium-226	0.133	U	0.116	0.117	0.200	0.209	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Radium-228	0.401		0.206	0.210		0.136	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Thallium-208	0.207		0.0710	0.0741		0.0269	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Thorium 228	0.437		0.110	0.124		0.0584	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Thorium-232	0.401		0.206	0.210		0.136	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Thorium-234	0.579		0.644	0.647		0.541	pCi/g	06/14/21 12:36	07/05/21 09:49	1
Uranium-235	0.156	U	0.460	0.461		0.533	pCi/g	06/14/21 12:36	07/05/21 09:49	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-003**

**Lab Sample ID: 160-42364-5**

Date Collected: 06/08/21 08:58

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-238	0.579		0.644	0.647		0.541	pCi/g	06/14/21 12:36	07/05/21 09:49	1

**Client Sample ID: HPPG-SFU-TU077A-004**

**Lab Sample ID: 160-42364-6**

Date Collected: 06/08/21 09:00

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.215	U	0.427	0.427		0.219	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Actinium-227	-0.459	U	0.903	0.904		0.544	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Americium-241	0.0196	U	0.220	0.220		0.181	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Bismuth-212	1.05		0.612	0.624		0.220	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Bismuth-214	0.405		0.165	0.172		0.0765	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Cesium-137	0.0338	U	0.0686	0.0687	0.0700	0.0522	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Lead-210	1.52		2.19	2.20		1.37	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Lead-212	0.416		0.122	0.132		0.0714	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Lead-214	0.493		0.143	0.154		0.0488	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Potassium-40	8.47		1.64	1.91		0.411	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Protactinium-231	-0.448	U	3.48	3.48		2.85	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Protactinium-234	0.160	U	0.306	0.306		0.315	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Radium-226	0.405		0.165	0.172	0.200	0.0765	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Radium-228	0.215	U	0.427	0.427		0.219	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thallium-208	0.217		0.0768	0.0808		0.0291	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thorium 228	0.416		0.122	0.132		0.0714	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thorium-232	0.215	U	0.427	0.427		0.219	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Thorium-234	0.642		0.707	0.712		0.532	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Uranium-235	-0.261	U	0.366	0.368		0.594	pCi/g	06/14/21 12:36	07/05/21 09:45	1
Uranium-238	0.642		0.707	0.712		0.532	pCi/g	06/14/21 12:36	07/05/21 09:45	1

**Client Sample ID: HPPG-SFU-TU077A-005**

**Lab Sample ID: 160-42364-7**

Date Collected: 06/08/21 09:10

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.481		0.201	0.206		0.0487	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Actinium-227	-0.431	U	0.849	0.851		0.511	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Americium-241	-0.0877	U	0.204	0.205		0.165	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Bismuth-212	-0.485	U	1.23	1.23		1.11	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Bismuth-214	0.580		0.159	0.169		0.0473	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Cesium-137	-0.0361	U	0.0853	0.0853	0.0700	0.0664	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Lead-210	0.746	U	1.90	1.90		1.27	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Lead-212	0.533		0.115	0.127		0.0525	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Lead-214	0.479		0.134	0.142		0.0627	pCi/g	06/14/21 12:36	07/05/21 09:48	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-005**

Date Collected: 06/08/21 09:10  
 Date Received: 06/09/21 14:10

**Lab Sample ID: 160-42364-7**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Potassium-40	8.92		2.18	2.36		0.680	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Protactinium-231	-0.0000000	U	3.45	3.45		2.84	pCi/g	06/14/21 12:36	07/05/21 09:48	1
375										
Protactinium-234	0.0420	U	0.0798	0.0799		0.274	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Radium-226	0.580		0.159	0.169	0.200	0.0473	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Radium-228	0.481		0.201	0.206		0.0487	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thallium-208	0.146		0.109	0.110		0.0525	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thorium 228	0.533		0.115	0.127		0.0525	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thorium-232	0.481		0.201	0.206		0.0487	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thorium-234	1.11		0.811	0.821		0.487	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Uranium-235	0.0557	U	0.153	0.153		0.504	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Uranium-238	1.11		0.811	0.821		0.487	pCi/g	06/14/21 12:36	07/05/21 09:48	1

**Client Sample ID: HPPG-SFU-TU077A-006**

Date Collected: 06/08/21 09:08  
 Date Received: 06/09/21 14:10

**Lab Sample ID: 160-42364-8**

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.411		0.141	0.147		0.122	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Actinium-227	0.522		0.422	0.427		0.221	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Americium-241	-0.0717	U	0.164	0.164		0.132	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Bismuth-212	-0.596	U	0.906	0.908		0.704	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Bismuth-214	0.404		0.118	0.125		0.0464	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Cesium-137	-0.0452	U	0.0791	0.0792	0.0700	0.0621	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Lead-210	-0.528	U	1.54	1.54		1.24	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Lead-212	0.458		0.0844	0.103		0.0337	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Lead-214	0.441		0.0986	0.109		0.0465	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Potassium-40	7.14		1.21	1.41		0.302	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Protactinium-231	0.552	U	1.72	1.72		1.87	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Protactinium-234	0.273		0.125	0.128		0.210	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Radium-226	0.404		0.118	0.125	0.200	0.0464	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Radium-228	0.411		0.141	0.147		0.122	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Thallium-208	0.153		0.0530	0.0554		0.0185	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Thorium 228	0.458		0.0844	0.103		0.0337	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Thorium-232	0.411		0.141	0.147		0.122	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Thorium-234	0.216	U	0.470	0.471		0.846	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Uranium-235	0.000	U	0.183	0.183		0.359	pCi/g	06/14/21 12:36	07/05/21 10:21	1
Uranium-238	0.216	U	0.470	0.471		0.846	pCi/g	06/14/21 12:36	07/05/21 10:21	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-007**

**Lab Sample ID: 160-42364-9**

Date Collected: 06/08/21 09:18  
 Date Received: 06/09/21 14:10

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.430		0.249	0.252		0.0933	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Actinium-227	-0.464	U	0.884	0.885		0.531	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Americium-241	0.0446	U	0.163	0.163		0.132	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Bismuth-212	-0.468	U	1.10	1.11		0.869	pCi/g	06/14/21 12:36	07/05/21 10:22	1
<b>Bismuth-214</b>	<b>0.504</b>		0.152	0.161		0.0623	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Cesium-137	-0.0677	U	0.122	0.122	0.0700	0.0958	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Lead-210	1.18	U	2.35	2.36		1.49	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Lead-212	0.526		0.109	0.122		0.0413	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Lead-214	0.336		0.144	0.148		0.0705	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Potassium-40	6.90		1.47	1.62		0.387	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Protactinium-231	0.000	U	0.926	0.926		2.85	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Protactinium-234	0.229	U	0.288	0.289		0.255	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Radium-226	0.504		0.152	0.161	0.200	0.0623	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Radium-228	0.430		0.249	0.252		0.0933	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Thallium-208	0.151		0.0835	0.0849		0.0373	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Thorium 228	0.526		0.109	0.122		0.0413	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Thorium-232	0.430		0.249	0.252		0.0933	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Thorium-234	-0.428	U	1.19	1.19		0.990	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Uranium-235	0.109	U	0.303	0.303		0.282	pCi/g	06/14/21 12:36	07/05/21 10:22	1
Uranium-238	-0.428	U	1.19	1.19		0.990	pCi/g	06/14/21 12:36	07/05/21 10:22	1

**Client Sample ID: HPPG-SFU-TU077A-008**

**Lab Sample ID: 160-42364-10**

Date Collected: 06/08/21 09:19  
 Date Received: 06/09/21 14:10

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.259		0.190	0.192		0.0829	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Actinium-227	0.114	U	0.330	0.330		0.298	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Americium-241	0.0622	U	0.139	0.139		0.112	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Bismuth-212	0.243	U	0.631	0.632		0.497	pCi/g	06/14/21 12:36	07/05/21 10:24	1
<b>Bismuth-214</b>	<b>0.325</b>		0.0929	0.0989		0.0361	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Cesium-137	0.00150	U	0.0422	0.0422	0.0700	0.0346	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Lead-210	-0.745	U	1.36	1.36		1.08	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Lead-212	0.354		0.0796	0.0919		0.0394	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Lead-214	0.373		0.0822	0.0909		0.0468	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Potassium-40	5.91		1.02	1.19		0.104	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Protactinium-231	0.311	U	1.18	1.18		1.85	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Protactinium-234	-0.116	U	0.318	0.318		0.259	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Radium-226	0.325		0.0929	0.0989	0.200	0.0361	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Radium-228	0.259		0.190	0.192		0.0829	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Thallium-208	0.162		0.0448	0.0478		0.0116	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Thorium 228	0.354		0.0796	0.0919		0.0394	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Thorium-232	0.259		0.190	0.192		0.0829	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Thorium-234	0.0863	U	0.181	0.182		0.458	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Uranium-235	-0.000659	U	0.00116	0.00116		0.495	pCi/g	06/14/21 12:36	07/05/21 10:24	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-008**

**Lab Sample ID: 160-42364-10**

Date Collected: 06/08/21 09:19

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.0863	U	0.181	0.182		0.458	pCi/g	06/14/21 12:36	07/05/21 10:24	1

**Client Sample ID: HPPG-SFU-TU077A-009**

**Lab Sample ID: 160-42364-11**

Date Collected: 06/08/21 09:30

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.415		0.254	0.259		0.115	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Actinium-227	-0.451	U	0.877	0.878		0.525	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Americium-241	0.0666	U	0.225	0.225		0.183	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Bismuth-212	-0.219	U	1.10	1.10		0.881	pCi/g	06/14/21 12:36	07/05/21 10:24	1
<b>Bismuth-214</b>	<b>0.435</b>		0.187	0.193		0.0720	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Cesium-137	0.0257	U	0.0616	0.0617	0.0700	0.0468	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Lead-210	0.799	U	2.09	2.10		1.41	pCi/g	06/14/21 12:36	07/05/21 10:24	1
<b>Lead-212</b>	<b>0.409</b>		0.119	0.129		0.0648	pCi/g	06/14/21 12:36	07/05/21 10:24	1
<b>Lead-214</b>	<b>0.407</b>		0.156	0.162		0.0718	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Potassium-40	<b>5.66</b>		2.10	2.20		0.880	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Protactinium-231	0.000	U	1.10	1.10		3.06	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Protactinium-234	0.0528	U	0.0913	0.0915		0.373	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Radium-226	<b>0.435</b>		0.187	0.193	0.200	0.0720	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Radium-228	<b>0.415</b>		0.254	0.259		0.115	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Thallium-208	<b>0.169</b>		0.0809	0.0832		0.0330	pCi/g	06/14/21 12:36	07/05/21 10:24	1
<b>Thorium 228</b>	<b>0.409</b>		0.119	0.129		0.0648	pCi/g	06/14/21 12:36	07/05/21 10:24	1
<b>Thorium-232</b>	<b>0.415</b>		0.254	0.259		0.115	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Thorium-234	-0.679	U	0.972	0.975		1.16	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Uranium-235	0.0284	U	0.210	0.210		0.657	pCi/g	06/14/21 12:36	07/05/21 10:24	1
Uranium-238	-0.679	U	0.972	0.975		1.16	pCi/g	06/14/21 12:36	07/05/21 10:24	1

**Client Sample ID: HPPG-SFU-TU077A-010**

**Lab Sample ID: 160-42364-12**

Date Collected: 06/08/21 09:37

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	<b>0.644</b>		0.248	0.257		0.0542	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Actinium-227	0.112	U	0.499	0.499		0.452	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Americium-241	-0.0371	U	0.122	0.122		0.110	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Bismuth-212	-0.0257	U	0.874	0.874		0.950	pCi/g	06/14/21 12:36	07/05/21 09:48	1
<b>Bismuth-214</b>	<b>0.393</b>		0.175	0.180		0.204	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Cesium-137	0.00519	U	0.0680	0.0680	0.0700	0.0548	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Lead-210	0.470	U	1.39	1.39		0.956	pCi/g	06/14/21 12:36	07/05/21 09:48	1
<b>Lead-212</b>	<b>0.421</b>		0.116	0.128		0.0575	pCi/g	06/14/21 12:36	07/05/21 09:48	1
<b>Lead-214</b>	<b>0.525</b>		0.158	0.167		0.0500	pCi/g	06/14/21 12:36	07/05/21 09:48	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-010**

**Lab Sample ID: 160-42364-12**

Date Collected: 06/08/21 09:37

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Potassium-40	7.35		1.72	1.88		0.368	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Protactinium-231	0.000	U	0.264	0.264		2.79	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Protactinium-234	0.0423	U	0.175	0.175		0.198	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Radium-226	0.393		0.175	0.180	0.200	0.204	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Radium-228	0.644		0.248	0.257		0.0542	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thallium-208	0.102		0.0921	0.0927		0.0379	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thorium 228	0.421		0.116	0.128		0.0575	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thorium-232	0.644		0.248	0.257		0.0542	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Thorium-234	0.651		0.639	0.643		0.477	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Uranium-235	0.0102	U	0.127	0.127		0.352	pCi/g	06/14/21 12:36	07/05/21 09:48	1
Uranium-238	0.651		0.639	0.643		0.477	pCi/g	06/14/21 12:36	07/05/21 09:48	1

**Client Sample ID: HPPG-SFU-TU077A-011**

**Lab Sample ID: 160-42364-13**

Date Collected: 06/08/21 09:07

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.0243	U	0.173	0.173	0.331	0.140	pCi/g	07/20/21 12:00	07/29/21 14:06	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	83.7		40 - 110					07/20/21 12:00	07/29/21 14:06	1
Y Carrier	90.8		40 - 110					07/20/21 12:00	07/29/21 14:06	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.271		0.140	0.142		0.0565	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Actinium-227	0.445		0.331	0.335		0.166	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Americium-241	0.0534	U	0.115	0.115		0.0922	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Bismuth-212	-0.216	U	0.674	0.675		0.537	pCi/g	06/14/21 16:22	07/05/21 06:42	1
<b>Bismuth-214</b>	<b>0.294</b>		0.0998	0.104		0.0422	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Cesium-137	0.0158	U	0.0335	0.0335	0.0700	0.0252	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Lead-210	0.574	U	1.25	1.25		1.00	pCi/g	06/14/21 16:22	07/05/21 06:42	1
<b>Lead-212</b>	<b>0.402</b>		0.0744	0.0907		0.0273	pCi/g	06/14/21 16:22	07/05/21 06:42	1
<b>Lead-214</b>	<b>0.293</b>		0.0868	0.0920		0.0375	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Potassium-40	5.57		0.977	1.13		0.0998	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Protactinium-231	0.000	U	0.194	0.194		1.73	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Protactinium-234	-0.0187	U	0.0328	0.0329		0.207	pCi/g	06/14/21 16:22	07/05/21 06:42	1
<b>Radium-226</b>	<b>0.294</b>		0.0998	0.104	0.200	0.0422	pCi/g	06/14/21 16:22	07/05/21 06:42	1
<b>Radium-228</b>	<b>0.271</b>		0.140	0.142		0.0565	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Thallium-208	0.133		0.0493	0.0512		0.0195	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Thorium 228	0.402		0.0744	0.0907		0.0273	pCi/g	06/14/21 16:22	07/05/21 06:42	1
<b>Thorium-232</b>	<b>0.271</b>		0.140	0.142		0.0565	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Thorium-234	0.191	U	0.425	0.425		0.797	pCi/g	06/14/21 16:22	07/05/21 06:42	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-011**

**Lab Sample ID: 160-42364-13**

Date Collected: 06/08/21 09:07

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-235	-0.155	U	0.432	0.432		0.351	pCi/g	06/14/21 16:22	07/05/21 06:42	1
Uranium-238	0.191	U	0.425	0.425		0.797	pCi/g	06/14/21 16:22	07/05/21 06:42	1

**Client Sample ID: HPPG-SFU-TU077A-012**

**Lab Sample ID: 160-42364-14**

Date Collected: 06/08/21 09:20

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-228	0.176	U	0.270	0.271		0.182	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Actinium-227	0.214	U	0.529	0.529		0.333	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Americium-241	-0.0976	U	0.233	0.234		0.189	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Bismuth-212	0.331	U	0.674	0.675		0.501	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Bismuth-214	0.247		0.148	0.151		0.0798	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Cesium-137	0.0359	U	0.0735	0.0736	0.0700	0.0561	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Lead-210	1.44		1.87	1.88		1.26	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Lead-212	0.364		0.113	0.121		0.0626	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Lead-214	0.306		0.198	0.202		0.0975	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Potassium-40	4.49		1.96	2.02		0.853	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Protactinium-231	0.000	U	1.22	1.22		3.11	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Protactinium-234	0.120	U	0.366	0.367		0.297	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Radium-226	0.247		0.148	0.151	0.200	0.0798	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Radium-228	0.176	U	0.270	0.271		0.182	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Thallium-208	0.0407	U	0.0621	0.0623		0.0615	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Thorium-228	0.364		0.113	0.121		0.0626	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Thorium-232	0.176	U	0.270	0.271		0.182	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Thorium-234	-0.220	U	0.817	0.817		0.679	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Uranium-235	0.0616	U	0.349	0.349		0.526	pCi/g	06/14/21 16:22	07/05/21 06:43	1
Uranium-238	-0.220	U	0.817	0.817		0.679	pCi/g	06/14/21 16:22	07/05/21 06:43	1

**Client Sample ID: HPPG-SFU-TU077A-013**

**Lab Sample ID: 160-42364-15**

Date Collected: 06/08/21 09:37

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-228	0.413		0.289	0.292		0.120	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Actinium-227	0.0946	U	0.433	0.433		0.394	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Americium-241	-0.0866	U	0.148	0.148		0.120	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Bismuth-212	-0.831	U	0.935	0.939		1.12	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Bismuth-214	0.526		0.186	0.193		0.0679	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Cesium-137	0.0176	U	0.0977	0.0977	0.0700	0.0784	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Lead-210	1.36		1.72	1.72		0.998	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Lead-212	0.337		0.105	0.114		0.0537	pCi/g	06/14/21 16:22	07/05/21 06:45	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-013**

**Lab Sample ID: 160-42364-15**

Date Collected: 06/08/21 09:37

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Lead-214	0.384		0.161	0.166		0.0768	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Potassium-40	7.07		1.68	1.83		0.363	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Protactinium-231	0.620	U	2.21	2.21		2.43	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Protactinium-234	0.138	U	0.280	0.280		0.189	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Radium-226	0.526		0.186	0.193	0.200	0.0679	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Radium-228	0.413		0.289	0.292		0.120	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thallium-208	0.154		0.104	0.105		0.0451	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thorium 228	0.337		0.105	0.114		0.0537	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thorium-232	0.413		0.289	0.292		0.120	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thorium-234	0.610		0.643	0.646		0.463	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Uranium-235	-0.189	U	0.405	0.406		0.371	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Uranium-238	0.610		0.643	0.646		0.463	pCi/g	06/14/21 16:22	07/05/21 06:45	1

**Client Sample ID: HPPG-SFU-TU077A-014**

**Lab Sample ID: 160-42364-16**

Date Collected: 06/08/21 08:47

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.702		0.231	0.242		0.0442	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Actinium-227	-0.0924	U	0.579	0.579		0.356	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Americium-241	-0.0830	U	0.193	0.193		0.156	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Bismuth-212	0.270	U	0.735	0.735		0.567	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Bismuth-214	0.525		0.157	0.166		0.0646	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Cesium-137	0.0236	U	0.0524	0.0524	0.0700	0.0393	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Lead-210	2.07		1.77	1.79		1.09	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Lead-212	0.432		0.105	0.114		0.0543	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Lead-214	0.540		0.135	0.146		0.0608	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Potassium-40	8.19		1.81	1.99		0.451	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Protactinium-231	0.595	U	2.02	2.02		2.21	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Protactinium-234	0.0338	U	0.0567	0.0568		0.270	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Radium-226	0.525		0.157	0.166	0.200	0.0646	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Radium-228	0.702		0.231	0.242		0.0442	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thallium-208	0.131		0.0790	0.0801		0.0366	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thorium 228	0.432		0.105	0.114		0.0543	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thorium-232	0.702		0.231	0.242		0.0442	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Thorium-234	0.530		0.550	0.553		0.453	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Uranium-235	0.0561	U	0.132	0.132		0.493	pCi/g	06/14/21 16:22	07/05/21 06:45	1
Uranium-238	0.530		0.550	0.553		0.453	pCi/g	06/14/21 16:22	07/05/21 06:45	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-015**

**Lab Sample ID: 160-42364-17**

Date Collected: 06/08/21 09:29

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.576		0.301	0.306		0.121	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Actinium-227	0.0855	U	0.354	0.354		0.427	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Americium-241	0.0788	U	0.192	0.193		0.155	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Bismuth-212	-0.287	U	1.06	1.06		0.846	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Bismuth-214</b>	<b>0.502</b>		0.168	0.176		0.0745	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Cesium-137	-0.0461	U	0.0803	0.0805	0.0700	0.0618	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Lead-210	0.798	U	1.87	1.87		1.23	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Lead-212</b>	<b>0.437</b>		0.116	0.125		0.0651	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Lead-214</b>	<b>0.531</b>		0.144	0.154		0.0591	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Potassium-40</b>	<b>8.38</b>		1.53	1.75		0.356	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Protactinium-231	0.897	U	2.32	2.32		2.54	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Protactinium-234	0.0158	U	0.0297	0.0298		0.318	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Radium-226</b>	<b>0.502</b>		0.168	0.176	0.200	0.0745	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Radium-228</b>	<b>0.576</b>		0.301	0.306		0.121	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Thallium-208</b>	<b>0.204</b>		0.0738	0.0766		0.0252	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Thorium 228</b>	<b>0.437</b>		0.116	0.125		0.0651	pCi/g	06/14/21 13:59	07/05/21 08:00	1
<b>Thorium-232</b>	<b>0.576</b>		0.301	0.306		0.121	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Thorium-234	-0.749	U	0.751	0.756		1.01	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Uranium-235	0.271	U	0.535	0.536		0.599	pCi/g	06/14/21 13:59	07/05/21 08:00	1
Uranium-238	-0.749	U	0.751	0.756		1.01	pCi/g	06/14/21 13:59	07/05/21 08:00	1

**Client Sample ID: HPPG-SFU-TU077A-016**

**Lab Sample ID: 160-42364-18**

Date Collected: 06/08/21 09:51

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.119		0.148	0.149		0.0825	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Actinium-227	0.141	U	0.306	0.307		0.209	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Americium-241	0.0115	U	0.0994	0.0994		0.0814	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Bismuth-212	0.00492	U	0.486	0.486		0.400	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Bismuth-214</b>	<b>0.240</b>		0.0836	0.0872		0.0353	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Cesium-137	0.0179	U	0.0340	0.0340	0.0700	0.0258	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Lead-210	-0.617	U	1.34	1.34		1.07	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Lead-212</b>	<b>0.201</b>		0.0518	0.0579		0.0234	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Lead-214</b>	<b>0.242</b>		0.0644	0.0691		0.0283	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Potassium-40</b>	<b>4.98</b>		0.848	0.989		0.0841	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Protactinium-231	0.0000003	U	1.83	1.83		1.51	pCi/g	06/14/21 13:59	07/05/21 08:01	1
			12							
Protactinium-234	0.0398	U	0.0626	0.0627		0.175	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Radium-226</b>	<b>0.240</b>		0.0836	0.0872	0.200	0.0353	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Radium-228</b>	<b>0.119</b>		0.148	0.149		0.0825	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Thallium-208</b>	<b>0.0807</b>		0.0357	0.0367		0.0142	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Thorium 228</b>	<b>0.201</b>		0.0518	0.0579		0.0234	pCi/g	06/14/21 13:59	07/05/21 08:01	1
<b>Thorium-232</b>	<b>0.119</b>		0.148	0.149		0.0825	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Thorium-234	0.000	U	0.250	0.250		0.673	pCi/g	06/14/21 13:59	07/05/21 08:01	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-016**

**Lab Sample ID: 160-42364-18**

Date Collected: 06/08/21 09:51

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-235	0.124	U	0.258	0.258		0.308	pCi/g	06/14/21 13:59	07/05/21 08:01	1
Uranium-238	0.000	U	0.250	0.250		0.673	pCi/g	06/14/21 13:59	07/05/21 08:01	1

**Client Sample ID: HPPG-SFU-TU077A-017**

**Lab Sample ID: 160-42364-19**

Date Collected: 06/08/21 09:21

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.421		0.123	0.130		0.0661	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Actinium-227	-0.369	U	0.718	0.720		0.414	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Americium-241	-0.0751	U	0.171	0.171		0.138	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Bismuth-212	-0.267	U	0.731	0.732		0.577	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Bismuth-214	0.266		0.0947	0.0986		0.0406	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Cesium-137	0.0182	U	0.0383	0.0384	0.0700	0.0288	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Lead-210	0.573	U	1.13	1.13		0.888	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Lead-212	0.0439	U	0.108	0.108		0.0868	pCi/g	06/14/21 13:59	07/06/21 22:10	1
<b>Lead-214</b>	<b>0.266</b>		<b>0.0864</b>	<b>0.0907</b>		<b>0.0342</b>	<b>pCi/g</b>	<b>06/14/21 13:59</b>	<b>07/06/21 22:10</b>	<b>1</b>
Potassium-40	6.33		1.20	1.36		0.327	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Protactinium-231	0.000	U	0.427	0.427		1.85	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Protactinium-234	-0.0884	U	0.253	0.254		0.206	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Radium-226	0.266		0.0947	0.0986	0.200	0.0406	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Radium-228	0.421		0.123	0.130		0.0661	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Thallium-208	0.104		0.0563	0.0574		0.0256	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Thorium 228	0.0439	U	0.108	0.108		0.0868	pCi/g	06/14/21 13:59	07/06/21 22:10	1
<b>Thorium-232</b>	<b>0.421</b>		<b>0.123</b>	<b>0.130</b>		<b>0.0661</b>	<b>pCi/g</b>	<b>06/14/21 13:59</b>	<b>07/06/21 22:10</b>	<b>1</b>
Thorium-234	0.000	U	0.400	0.400		0.783	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Uranium-235	0.000	U	0.160	0.160		0.362	pCi/g	06/14/21 13:59	07/06/21 22:10	1
Uranium-238	0.000	U	0.400	0.400		0.783	pCi/g	06/14/21 13:59	07/06/21 22:10	1

**Client Sample ID: HPPG-SFU-TU077A-018**

**Lab Sample ID: 160-42364-20**

Date Collected: 06/08/21 09:47

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.468		0.151	0.159		0.0999	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Actinium-227	0.166	U	0.493	0.494		0.328	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Americium-241	-0.0800	U	0.142	0.142		0.153	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Bismuth-212	0.000	U	0.387	0.387		0.664	pCi/g	06/14/21 13:59	07/05/21 08:02	1
<b>Bismuth-214</b>	<b>0.328</b>		<b>0.128</b>	<b>0.132</b>		<b>0.0571</b>	<b>pCi/g</b>	<b>06/14/21 13:59</b>	<b>07/05/21 08:02</b>	<b>1</b>
Cesium-137	0.0220	U	0.0453	0.0454	0.0700	0.0342	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Lead-210	-2.31	U	1.65	1.67		1.65	pCi/g	06/14/21 13:59	07/05/21 08:02	1
<b>Lead-212</b>	<b>0.388</b>		<b>0.0922</b>	<b>0.105</b>		<b>0.0436</b>	<b>pCi/g</b>	<b>06/14/21 13:59</b>	<b>07/05/21 08:02</b>	<b>1</b>

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-018**

**Lab Sample ID: 160-42364-20**

Date Collected: 06/08/21 09:47

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Lead-214	0.390		0.127	0.134		0.0603	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Potassium-40	5.71		1.20	1.33		0.342	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Protactinium-231	0.000	U	0.647	0.647		2.41	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Protactinium-234	0.170	U	0.329	0.329		0.234	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Radium-226	0.328		0.128	0.132	0.200	0.0571	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Radium-228	0.468		0.151	0.159		0.0999	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Thallium-208	0.0497	U	0.0907	0.0909		0.0508	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Thorium 228	0.388		0.0922	0.105		0.0436	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Thorium-232	0.468		0.151	0.159		0.0999	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Thorium-234	0.0436	U	0.603	0.603		0.489	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Uranium-235	-0.0637	U	0.105	0.105		0.475	pCi/g	06/14/21 13:59	07/05/21 08:02	1
Uranium-238	0.0436	U	0.603	0.603		0.489	pCi/g	06/14/21 13:59	07/05/21 08:02	1

**Client Sample ID: HPPG-SFU-TU077A-019**

**Lab Sample ID: 160-42364-21**

Date Collected: 06/08/21 09:47

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.484		0.253	0.257		0.0981	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Actinium-227	0.291		0.447	0.448		0.258	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Americium-241	0.0672	U	0.157	0.157		0.126	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Bismuth-212	-0.0399	U	1.12	1.12		0.638	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Bismuth-214	0.340		0.173	0.177		0.0777	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Cesium-137	-0.00757	U	0.0688	0.0688	0.0700	0.0558	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Lead-210	-1.08	U	1.98	1.99		1.68	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Lead-212	0.433		0.106	0.115		0.0541	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Lead-214	0.508		0.134	0.144		0.0574	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Potassium-40	7.48		1.56	1.74		0.187	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Protactinium-231	-0.0000002	U	2.92	2.92		2.41	pCi/g	06/14/21 13:59	07/05/21 08:03	1
	80									
Protactinium-234	0.0822	U	0.251	0.251		0.204	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Radium-226	0.340		0.173	0.177	0.200	0.0777	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Radium-228	0.484		0.253	0.257		0.0981	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Thallium-208	0.160		0.0601	0.0623		0.0209	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Thorium 228	0.433		0.106	0.115		0.0541	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Thorium-232	0.484		0.253	0.257		0.0981	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Thorium-234	-0.841	U	0.570	0.577		1.24	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Uranium-235	0.0472	U	0.113	0.113		0.379	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Uranium-238	-0.841	U	0.570	0.577		1.24	pCi/g	06/14/21 13:59	07/05/21 08:03	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-020**

**Lab Sample ID: 160-42364-22**

Date Collected: 06/08/21 10:03

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.610		0.231	0.239		0.0496	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Actinium-227	-0.383	U	0.743	0.744		0.476	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Americium-241	0.0176	U	0.146	0.146		0.101	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Bismuth-212	0.311	U	0.896	0.897		0.698	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Bismuth-214</b>	<b>0.356</b>		0.160	0.164		0.0698	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Cesium-137	-0.0373	U	0.0988	0.0989	0.0700	0.0602	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Lead-210	-0.131	U	1.57	1.57		1.12	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Lead-212</b>	<b>0.470</b>		0.112	0.127		0.0503	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Lead-214</b>	<b>0.534</b>		0.169	0.178		0.0647	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Potassium-40</b>	<b>6.47</b>		1.55	1.68		0.337	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Protactinium-231	0.000	U	0.936	0.936		2.31	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Protactinium-234	0.0743	U	0.194	0.195		0.155	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Radium-226</b>	<b>0.356</b>		0.160	0.164	0.200	0.0698	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Radium-228</b>	<b>0.610</b>		0.231	0.239		0.0496	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Thallium-208	0.134		0.132	0.132		0.0533	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Thorium 228</b>	<b>0.470</b>		0.112	0.127		0.0503	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Thorium-232</b>	<b>0.610</b>		0.231	0.239		0.0496	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Thorium-234</b>	<b>0.628</b>		0.660	0.664		0.485	pCi/g	06/14/21 13:59	07/05/21 08:03	1
Uranium-235	0.0130	U	0.154	0.154		0.332	pCi/g	06/14/21 13:59	07/05/21 08:03	1
<b>Uranium-238</b>	<b>0.628</b>		0.660	0.664		0.485	pCi/g	06/14/21 13:59	07/05/21 08:03	1

**Client Sample ID: HPPG-SFU-TU077A-021**

**Lab Sample ID: 160-42364-23**

Date Collected: 06/08/21 09:58

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Strontium-90	0.150		0.167	0.167	0.331	0.125	pCi/g	07/20/21 12:00	07/29/21 14:06	1
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Sr Carrier	91.0		40 - 110					07/20/21 12:00	07/29/21 14:06	1
Y Carrier	90.8		40 - 110					07/20/21 12:00	07/29/21 14:06	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.618		0.202	0.211		0.0557	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Actinium-227	0.150	U	0.321	0.321		0.360	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Americium-241	0.0590	U	0.130	0.130		0.104	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Bismuth-212	0.123	U	0.881	0.881		0.717	pCi/g	06/14/21 13:59	07/05/21 08:33	1
<b>Bismuth-214</b>	<b>0.181</b>		0.104	0.105		0.118	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Cesium-137	0.0213	U	0.0429	0.0429	0.0700	0.0327	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Lead-210	0.0439	U	1.58	1.58		1.30	pCi/g	06/14/21 13:59	07/05/21 08:33	1
<b>Lead-212</b>	<b>0.414</b>		0.0845	0.100		0.0387	pCi/g	06/14/21 13:59	07/05/21 08:33	1
<b>Lead-214</b>	<b>0.422</b>		0.0955	0.105		0.0319	pCi/g	06/14/21 13:59	07/05/21 08:33	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-021**

**Lab Sample ID: 160-42364-23**

Date Collected: 06/08/21 09:58

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Potassium-40	6.44		1.15	1.33		0.301	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Protactinium-231	-0.0000002	U	2.40	2.40		1.98	pCi/g	06/14/21 13:59	07/05/21 08:33	1
01										
Protactinium-234	0.0824	U	0.214	0.214		0.173	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Radium-226	0.181		0.104	0.105	0.200	0.118	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Radium-228	0.618		0.202	0.211		0.0557	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thallium-208	0.146		0.0432	0.0458		0.0119	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thorium 228	0.414		0.0845	0.100		0.0387	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thorium-232	0.618		0.202	0.211		0.0557	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thorium-234	0.000	U	0.404	0.404		0.866	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Uranium-235	0.191	U	0.328	0.329		0.351	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Uranium-238	0.000	U	0.404	0.404		0.866	pCi/g	06/14/21 13:59	07/05/21 08:33	1

**Client Sample ID: HPPG-SFU-TU077A-022**

**Lab Sample ID: 160-42364-24**

Date Collected: 06/08/21 10:08

Matrix: Solid

Date Received: 06/09/21 14:10

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.728		0.200	0.213		0.0831	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Actinium-227	-0.386	U	0.806	0.807		0.487	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Americium-241	0.0833	U	0.202	0.202		0.163	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Bismuth-212	0.000	U	0.416	0.416		0.697	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Bismuth-214	0.794		0.170	0.188		0.0555	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Cesium-137	-0.00574	U	0.0795	0.0796	0.0700	0.0650	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Lead-210	2.23		1.81	1.83		1.15	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Lead-212	0.533		0.129	0.140		0.0605	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Lead-214	0.00512	U	0.0364	0.0364		0.172	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Potassium-40	5.95		1.29	1.42		0.344	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Protactinium-231	0.869	U	2.26	2.26		2.48	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Protactinium-234	0.0352	U	0.0456	0.0458		0.309	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Radium-226	0.794		0.170	0.188	0.200	0.0555	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Radium-228	0.728		0.200	0.213		0.0831	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thallium-208	0.294		0.0948	0.0994		0.0345	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thorium 228	0.533		0.129	0.140		0.0605	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thorium-232	0.728		0.200	0.213		0.0831	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Thorium-234	-1.24	U	0.866	0.877		1.18	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Uranium-235	0.192	U	0.557	0.557		0.452	pCi/g	06/14/21 13:59	07/05/21 08:33	1
Uranium-238	-1.24	U	0.866	0.877		1.18	pCi/g	06/14/21 13:59	07/05/21 08:33	1

Eurofins TestAmerica, St. Louis

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-023**

**Lab Sample ID: 160-42364-25**

Date Collected: 06/08/21 10:10  
 Date Received: 06/09/21 14:10

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.520		0.156	0.165		0.117	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Actinium-227	0.132	U	0.278	0.279		0.243	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Americium-241	-0.0741	U	0.165	0.165		0.133	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Bismuth-212	-0.0589	U	0.723	0.723		0.591	pCi/g	06/14/21 13:59	07/05/21 08:35	1
<b>Bismuth-214</b>	<b>0.372</b>		0.0988	0.106		0.0361	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Cesium-137	-0.0250	U	0.0540	0.0541	0.0700	0.0422	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Lead-210	0.577	U	1.16	1.16		0.918	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Lead-212	0.361		0.0816	0.0940		0.0414	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Lead-214	0.405		0.114	0.121		0.0475	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Potassium-40	7.29		1.14	1.36		0.104	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Protactinium-231	-0.0000000	U	2.40	2.40		1.98	pCi/g	06/14/21 13:59	07/05/21 08:35	1
	480									
Protactinium-234	-0.105	U	0.299	0.299		0.243	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Radium-226	0.372		0.0988	0.106	0.200	0.0361	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Radium-228	0.520		0.156	0.165		0.117	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Thallium-208	0.219		0.0590	0.0632		0.0183	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Thorium 228	0.361		0.0816	0.0940		0.0414	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Thorium-232	0.520		0.156	0.165		0.117	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Thorium-234	0.299	U	0.698	0.698		0.870	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Uranium-235	0.170	U	0.411	0.411		0.394	pCi/g	06/14/21 13:59	07/05/21 08:35	1
Uranium-238	0.299	U	0.698	0.698		0.870	pCi/g	06/14/21 13:59	07/05/21 08:35	1

**Client Sample ID: HPPG-SFU-TU077A-024**

**Lab Sample ID: 160-42364-26**

Date Collected: 06/08/21 10:14  
 Date Received: 06/09/21 14:10

Matrix: Solid

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.538		0.199	0.206		0.114	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Actinium-227	-0.434	U	0.825	0.826		0.497	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Americium-241	0.0821	U	0.199	0.199		0.161	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Bismuth-212	0.384	U	0.691	0.692		0.521	pCi/g	06/14/21 13:59	07/06/21 22:11	1
<b>Bismuth-214</b>	<b>0.399</b>		0.165	0.170		0.0768	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Cesium-137	0.0306	U	0.0582	0.0583	0.0700	0.0442	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Lead-210	1.62		2.05	2.06		1.23	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Lead-212	0.462		0.106	0.117		0.0531	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Lead-214	0.390		0.127	0.133		0.0648	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Potassium-40	8.11		1.45	1.67		0.334	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Protactinium-231	-1.07	U	3.58	3.58		2.92	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Protactinium-234	-0.119	U	0.361	0.361		0.294	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Radium-226	0.399		0.165	0.170	0.200	0.0768	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Radium-228	0.538		0.199	0.206		0.114	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Thallium-208	0.223		0.0642	0.0681		0.0155	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Thorium 228	0.462		0.106	0.117		0.0531	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Thorium-232	0.538		0.199	0.206		0.114	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Thorium-234	-0.704	U	0.730	0.735		0.988	pCi/g	06/14/21 13:59	07/06/21 22:11	1

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# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
 SDG: GJ46599762

**Client Sample ID: HPPG-SFU-TU077A-024**

**Lab Sample ID: 160-42364-26**

Date Collected: 06/08/21 10:14  
 Date Received: 06/09/21 14:10

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-235	0.177	U	0.380	0.381		0.304	pCi/g	06/14/21 13:59	07/06/21 22:11	1
Uranium-238	-0.704	U	0.730	0.735		0.988	pCi/g	06/14/21 13:59	07/06/21 22:11	1

**Client Sample ID: HPPG-SFU-TU077A-025**

**Lab Sample ID: 160-42364-27**

Date Collected: 06/08/21 10:20  
 Date Received: 06/09/21 14:10

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-228	0.304		0.165	0.168		0.0747	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Actinium-227	0.0116	U	0.0306	0.0307		0.426	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Americium-241	-0.0582	U	0.140	0.141		0.165	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Bismuth-212	1.03		0.569	0.579		0.291	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Bismuth-214	0.451		0.132	0.140		0.0511	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Cesium-137	0.0286	U	0.0612	0.0613	0.0700	0.0473	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Lead-210	1.25		1.63	1.64		1.07	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Lead-212	0.566		0.158	0.174		0.104	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Lead-214	0.481		0.156	0.164		0.0705	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Potassium-40	7.10		1.36	1.54		0.362	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Protactinium-231	0.734	U	2.24	2.24		2.46	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Protactinium-234	0.0246	U	0.0453	0.0453		0.313	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Radium-226	0.451		0.132	0.140	0.200	0.0511	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Radium-228	0.304		0.165	0.168		0.0747	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thallium-208	0.203		0.0604	0.0640		0.0192	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thorium-228	0.566		0.158	0.174		0.104	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thorium-232	0.304		0.165	0.168		0.0747	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thorium-234	0.525		0.569	0.572		0.496	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Uranium-235	-0.0483	U	0.347	0.347		0.602	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Uranium-238	0.525		0.569	0.572		0.496	pCi/g	06/14/21 13:59	07/05/21 08:38	1

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# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Method: 905 - Strontium-90 (GFPC)

**Lab Sample ID:** MB 160-519394/23-A

**Matrix:** Solid

**Analysis Batch:** 520677

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 519394

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Strontium-90	0.04134	U	0.0605	0.0606	0.331	0.0468	pCi/g	07/20/21 12:00	07/29/21 19:09	1
<b>Carrier</b>										
<i>Sr Carrier</i> 84.0      40 - 110      07/20/21 12:00      07/29/21 19:09      1										
<i>Y Carrier</i> 92.6      40 - 110      07/20/21 12:00      07/29/21 19:09      1										

**Lab Sample ID:** LCS 160-519394/1-A

**Matrix:** Solid

**Analysis Batch:** 520677

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 519394

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Result	Qualifier									
Strontium-90	2.44		2.352			0.252	0.331	0.0451	pCi/g	96	75 - 125
<b>Carrier</b>											
<i>Sr Carrier</i> 85.3      40 - 110      07/20/21 12:00      07/29/21 19:09      1											
<i>Y Carrier</i> 92.3      40 - 110											

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID:** MB 160-514236/1-A

**Matrix:** Solid

**Analysis Batch:** 517445

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514236

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Actinium 228	0.0000	U	0.0339	0.0339		0.0625	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Actinium-227	0.1237	U	0.181	0.181		0.205	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Americium-241	0.03025	U	0.0695	0.0696		0.0545	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Bismuth-212	-0.4893	U	0.768	0.770		0.591	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Bismuth-214	0.009810	U	0.166	0.166		0.135	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Cesium-137	0.0000	U	0.0181	0.0181	0.0700	0.0372	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Lead-210	-0.5263	U	1.15	1.16		0.917	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Lead-212	0.01592	U	0.0753	0.0753		0.0608	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Lead-214	0.1143		0.0777	0.0786		0.0510	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Potassium-40	0.2366		0.212	0.213		0.110	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Protactinium-231	0.0000	U	0.152	0.152		1.40	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Protactinium-234	0.09026	U	0.0807	0.0813		0.145	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Radium-226	0.009810	U	0.166	0.166	0.200	0.135	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Radium-228	0.0000	U	0.0339	0.0339		0.0625	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Thallium-208	0.01687		0.0249	0.0249		0.0124	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Thorium 228	0.01592	U	0.0753	0.0753		0.0608	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Thorium-232	0.0000	U	0.0339	0.0339		0.0625	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Thorium-234	0.08986	U	0.269	0.269		0.513	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Uranium-235	0.0000	U	0.0711	0.0711		0.245	pCi/g	06/14/21 12:36	07/07/21 09:58	1
Uranium-238	0.08986	U	0.269	0.269		0.513	pCi/g	06/14/21 12:36	07/07/21 09:58	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** LCS 160-514236/2-A

**Matrix:** Solid

**Analysis Batch:** 517194

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 514236

Analyte	Spike Added	LCS		Total Uncert.		LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	(2σ+/-)						
Americium-241	96.3	91.71		9.63			0.518	pCi/g	95	87 - 116
Cesium-137	26.4	25.99		2.78	0.0700	0.0779	pCi/g	99	87 - 120	
Cobalt-60	8.80	8.594		0.913			0.0390	pCi/g	98	87 - 115

**Lab Sample ID:** 160-42364-12 DU

**Matrix:** Solid

**Analysis Batch:** 517202

**Client Sample ID:** HPPG-SFU-TU077A-010

**Prep Type:** Total/NA

**Prep Batch:** 514236

Analyte	Sample		DU		Total		LOQ	DLC	Unit	RER	Limit
	Result	Qual	Result	Qual	Uncert.	(2σ+/-)					
Actinium 228	0.644		0.3741		0.202			0.182	pCi/g	0.59	1
Actinium-227	0.112	U	0.08283	U	0.550			0.350	pCi/g	0.03	1
Americium-241	-0.0371	U	-0.00156	U	0.197			0.162	pCi/g	0.11	1
Bismuth-212	-0.0257	U	-0.4512	U	0.675			0.856	pCi/g	0.27	1
Bismuth-214	0.393		0.4008		0.140			0.0472	pCi/g	0.02	1
Cesium-137	0.00519	U	0.01737	U	0.0724	0.0700	0.0575	pCi/g		0.09	1
Lead-210	0.470	U	2.075		2.12			1.61	pCi/g	0.46	1
Lead-212	0.421		0.4396		0.117			0.0526	pCi/g	0.07	1
Lead-214	0.525		0.5351		0.133			0.0490	pCi/g	0.04	1
Potassium-40	7.35		9.654		2.08			0.200	pCi/g	0.58	1
Protactinium-231	0.000	U	0.0000	U	0.628			2.68	pCi/g	0	1
Protactinium-234	0.0423	U	0.1318	U	0.0844			0.301	pCi/g	0.34	1
Radium-226	0.393		0.4008		0.140	0.200	0.0472	pCi/g		0.02	1
Radium-228	0.644		0.3741		0.202			0.182	pCi/g	0.59	1
Thallium-208	0.102		0.1212		0.0890			0.0403	pCi/g	0.11	1
Thorium 228	0.421		0.4396		0.117			0.0526	pCi/g	0.07	1
Thorium-232	0.644		0.3741		0.202			0.182	pCi/g	0.59	1
Thorium-234	0.651		1.792		0.751			0.439	pCi/g	0.82	1
Uranium-235	0.0102	U	-0.02447	U	0.0372			0.547	pCi/g	0.21	1
Uranium-238	0.651		1.792		0.751			0.439	pCi/g	0.82	1

**Lab Sample ID:** MB 160-514243/1-A

**Matrix:** Solid

**Analysis Batch:** 517202

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514243

Analyte	MB		Count		Total		LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB	Qualifier	Uncert.	(2σ+/-)	Uncert.						
Actinium 228	0.0000	U		0.0421	0.0421			0.0490	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Actinium-227	0.1487	U		0.311	0.311			0.176	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Americium-241	0.006283	U		0.120	0.120			0.0986	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Bismuth-212	-0.03199	U		1.10	1.10			0.857	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Bismuth-214	-0.1519	U		0.147	0.148			0.269	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Cesium-137	0.02619	U		0.0535	0.0536	0.0700	0.0394	pCi/g		06/14/21 13:59	07/05/21 08:38	1
Lead-210	0.3520	U		1.41	1.41			1.01	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Lead-212	-0.02631	U		0.0488	0.0489			0.0810	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Lead-214	-0.0002984	U		0.00267	0.00267			0.103	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Potassium-40	-0.06934	U		0.563	0.563			0.202	pCi/g	06/14/21 13:59	07/05/21 08:38	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** MB 160-514243/1-A

**Matrix:** Solid

**Analysis Batch:** 517202

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514243

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Qualifier	(2σ+/-)	Uncert.	(2σ+/-)					
Protactinium-231	0.4668	U			1.38		1.38	1.53	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Protactinium-234	-0.03703	U			0.208		0.208	0.169	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Radium-226	-0.1519	U			0.147		0.148	0.200	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Radium-228	0.0000	U			0.0421		0.0421	0.0490	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thallium-208	0.01256	U			0.00808		0.00818	0.0406	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thorium 228	-0.02631	U			0.0488		0.0489	0.0810	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thorium-232	0.0000	U			0.0421		0.0421	0.0490	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Thorium-234	0.3173	U			0.510		0.512	0.351	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Uranium-235	0.008560	U			0.0221		0.0222	0.301	pCi/g	06/14/21 13:59	07/05/21 08:38	1
Uranium-238	0.3173	U			0.510		0.512	0.351	pCi/g	06/14/21 13:59	07/05/21 08:38	1

**Lab Sample ID:** LCS 160-514243/2-A

**Matrix:** Solid

**Analysis Batch:** 517203

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 514243

Analyte	Spike Added	LCS Result	LCS Qual	Total		LOQ	DLC	Unit	%Rec	%Rec.	
				Uncert.	(2σ+/-)					Limits	
Americium-241	96.3	97.70		10.3			0.642	pCi/g	101	87 - 116	
Cesium-137	26.4	26.15		2.83		0.0700	0.105	pCi/g	99	87 - 120	
Cobalt-60	8.80	8.873		0.966			0.0186	pCi/g	101	87 - 115	

**Lab Sample ID:** 160-42364-27 DU

**Matrix:** Solid

**Analysis Batch:** 517324

**Client Sample ID:** HPPG-SFU-TU077A-025

**Prep Type:** Total/NA

**Prep Batch:** 514243

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total		LOQ	DLC	Unit	RER	Limit
					Uncert.	(2σ+/-)					
Actinium 228	0.304		0.2959		0.159		0.0841	pCi/g		0.02	1
Actinium-227	0.0116	U	-0.3346	U	0.643		0.370	pCi/g		0.51	1
Americium-241	-0.0582	U	0.06564	U	0.147		0.118	pCi/g		0.43	1
Bismuth-212	1.03		0.4165	U	0.791		0.617	pCi/g		0.45	1
Bismuth-214	0.451		0.3726		0.119		0.0464	pCi/g		0.30	1
Cesium-137	0.0286	U	-0.02230	U	0.0531		0.0700	0.0415	pCi/g	0.45	1
Lead-210	1.25		0.4979	U	1.10		0.874	pCi/g		0.28	1
Lead-212	0.566		0.4740		0.101		0.0264	pCi/g		0.33	1
Lead-214	0.481		0.4699		0.115		0.0417	pCi/g		0.04	1
Potassium-40	7.10		7.926		1.44		0.105	pCi/g		0.28	1
Protactinium-231	0.734	U	0.0000	U	0.250		1.92	pCi/g		0.29	1
Protactinium-234	0.0246	U	0.1215	U	0.251		0.180	pCi/g		0.33	1
Radium-226	0.451		0.3726		0.119		0.0464	pCi/g		0.30	1
Radium-228	0.304		0.2959		0.159		0.0841	pCi/g		0.02	1
Thallium-208	0.203		0.1222		0.0658		0.0270	pCi/g		0.63	1
Thorium 228	0.566		0.4740		0.101		0.0264	pCi/g		0.33	1
Thorium-232	0.304		0.2959		0.159		0.0841	pCi/g		0.02	1
Thorium-234	0.525		-0.1025	U	0.310		0.980	pCi/g		0.71	1
Uranium-235	-0.0483	U	0.08279	U	0.285		0.335	pCi/g		0.21	1
Uranium-238	0.525		-0.1025	U	0.310		0.980	pCi/g		0.71	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID:** MB 160-514265/1-A

**Matrix:** Solid

**Analysis Batch:** 517201

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514265

Analyte	MB	MB	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Uncert.		(2σ+/-)	Uncert.						
Actinium 228	0.06180	U		0.130	0.130		0.0653	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Actinium-227	0.0000	U		0.211	0.211		0.216	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Americium-241	0.03648	U		0.0848	0.0849		0.0670	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Bismuth-212	0.0000	U		0.229	0.229		0.215	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Bismuth-214	-0.05108	U		0.143	0.143		0.120	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Cesium-137	-0.01799	U		0.0473	0.0473	0.0700	0.0368	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Lead-210	-0.5165	U		0.992	0.994		0.776	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Lead-212	0.0000	U		0.0433	0.0433		0.0635	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Lead-214	0.004755	U		0.0734	0.0734		0.0591	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Potassium-40	0.05866	U		0.416	0.416		0.323	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Protactinium-231	0.1819	U		0.888	0.889		1.38	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Protactinium-234	0.06592	U		0.142	0.143		0.135	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Radium-226	-0.05108	U		0.143	0.143	0.200	0.120	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Radium-228	0.06180	U		0.130	0.130		0.0653	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Thallium-208	0.01828	U		0.0485	0.0486		0.0253	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Thorium 228	0.0000	U		0.0433	0.0433		0.0635	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Thorium-232	0.06180	U		0.130	0.130		0.0653	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Thorium-234	0.02851	U		0.0638	0.0638		0.517	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Uranium-235	0.0000	U		0.112	0.112		0.232	pCi/g	06/14/21 16:22	07/05/21 06:40	1
Uranium-238	0.02851	U		0.0638	0.0638		0.517	pCi/g	06/14/21 16:22	07/05/21 06:40	1

**Lab Sample ID:** LCS 160-514265/2-A

**Matrix:** Solid

**Analysis Batch:** 517200

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 514265

Analyte	Spike	LCS	LCS	Uncert.	(2σ+/-)	LOQ	DLC	Unit	%Rec	Limits	Total
	Added	Result	Qual								
Americium-241	96.3	98.20		11.5			0.533	pCi/g	102	87 - 116	
Cesium-137	26.4	29.37		3.09		0.0700	0.132	pCi/g	111	87 - 120	
Cobalt-60	8.80	9.545		1.01			0.0495	pCi/g	108	87 - 115	

**Lab Sample ID:** 160-42364-16 DU

**Matrix:** Solid

**Analysis Batch:** 517203

**Client Sample ID:** HPPG-SFU-TU077A-014

**Prep Type:** Total/NA

**Prep Batch:** 514265

Analyte	Sample	Sample	DU	DU	Uncert.	(2σ+/-)	LOQ	DLC	Unit	RER	Limit
	Result	Qual	Result	Qual							
Actinium 228	0.702		0.2131	U	0.259			0.240	pCi/g	0.98	1
Actinium-227	-0.0924	U	-0.1272	U	0.643			0.432	pCi/g	0.03	1
Americium-241	-0.0830	U	-0.07459	U	0.125			0.108	pCi/g	0.03	1
Bismuth-212	0.270	U	0.4460	U	0.863			0.649	pCi/g	0.11	1
Bismuth-214	0.525		0.06826	U	0.307			0.173	pCi/g	0.97	1
Cesium-137	0.0236	U	0.009585	U	0.0784	0.0700		0.0631	pCi/g	0.11	1
Lead-210	2.07		1.274		1.44			0.915	pCi/g	0.25	1
Lead-212	0.432		0.3838		0.109			0.0384	pCi/g	0.22	1
Lead-214	0.540		0.3828		0.148			0.0619	pCi/g	0.53	1
Potassium-40	8.19		7.618		1.84			0.335	pCi/g	0.15	1
Protactinium-231	0.595	U	-1.018	U	3.29			2.66	pCi/g	0.30	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-42364-16 DU

Client Sample ID: HPPG-SFU-TU077A-014

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 517203

Prep Batch: 514265

Analyte	Sample	Sample	DU		DU		Total				RER	Limit
	Result	Qual	Result	Qual	(2σ+/-)	LOQ	DLC	Unit	RER	Limit		
Protactinium-234	0.0338	U	0.1385	U	0.313		0.203	pCi/g			0.28	1
Radium-226	0.525		0.06826	U	0.307	0.200	0.173	pCi/g			0.97	1
Radium-228	0.702		0.2131	U	0.259		0.240	pCi/g			0.98	1
Thallium-208	0.131		0.1864		0.0712		0.0209	pCi/g			0.37	1
Thorium 228	0.432		0.3838		0.109		0.0384	pCi/g			0.22	1
Thorium-232	0.702		0.2131	U	0.259		0.240	pCi/g			0.98	1
Thorium-234	0.530		0.7169		0.682		0.501	pCi/g			0.15	1
Uranium-235	0.0561	U	0.2564		0.289		0.248	pCi/g			0.48	1
Uranium-238	0.530		0.7169		0.682		0.501	pCi/g			0.15	1

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

## Rad

### Leach Batch: 513637

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42364-1	HPPG-F-065	Total/NA	Solid	Dry and Grind	
160-42364-2	HPPG-F-066	Total/NA	Solid	Dry and Grind	
160-42364-4	HPPG-SFU-TU077A-002	Total/NA	Solid	Dry and Grind	
160-42364-5	HPPG-SFU-TU077A-003	Total/NA	Solid	Dry and Grind	
160-42364-6	HPPG-SFU-TU077A-004	Total/NA	Solid	Dry and Grind	
160-42364-9	HPPG-SFU-TU077A-007	Total/NA	Solid	Dry and Grind	
160-42364-10	HPPG-SFU-TU077A-008	Total/NA	Solid	Dry and Grind	
160-42364-11	HPPG-SFU-TU077A-009	Total/NA	Solid	Dry and Grind	
160-42364-12	HPPG-SFU-TU077A-010	Total/NA	Solid	Dry and Grind	
160-42364-13	HPPG-SFU-TU077A-011	Total/NA	Solid	Dry and Grind	
160-42364-17	HPPG-SFU-TU077A-015	Total/NA	Solid	Dry and Grind	
160-42364-18	HPPG-SFU-TU077A-016	Total/NA	Solid	Dry and Grind	
160-42364-21	HPPG-SFU-TU077A-019	Total/NA	Solid	Dry and Grind	
160-42364-22	HPPG-SFU-TU077A-020	Total/NA	Solid	Dry and Grind	
160-42364-23	HPPG-SFU-TU077A-021	Total/NA	Solid	Dry and Grind	
160-42364-24	HPPG-SFU-TU077A-022	Total/NA	Solid	Dry and Grind	
160-42364-25	HPPG-SFU-TU077A-023	Total/NA	Solid	Dry and Grind	
160-42364-27	HPPG-SFU-TU077A-025	Total/NA	Solid	Dry and Grind	
160-42364-12 DU	HPPG-SFU-TU077A-010	Total/NA	Solid	Dry and Grind	
160-42364-27 DU	HPPG-SFU-TU077A-025	Total/NA	Solid	Dry and Grind	

### Leach Batch: 513640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42364-3	HPPG-SFU-TU077A-001	Total/NA	Solid	Dry and Grind	
160-42364-7	HPPG-SFU-TU077A-005	Total/NA	Solid	Dry and Grind	
160-42364-8	HPPG-SFU-TU077A-006	Total/NA	Solid	Dry and Grind	
160-42364-14	HPPG-SFU-TU077A-012	Total/NA	Solid	Dry and Grind	
160-42364-15	HPPG-SFU-TU077A-013	Total/NA	Solid	Dry and Grind	
160-42364-16	HPPG-SFU-TU077A-014	Total/NA	Solid	Dry and Grind	
160-42364-19	HPPG-SFU-TU077A-017	Total/NA	Solid	Dry and Grind	
160-42364-20	HPPG-SFU-TU077A-018	Total/NA	Solid	Dry and Grind	
160-42364-26	HPPG-SFU-TU077A-024	Total/NA	Solid	Dry and Grind	
160-42364-16 DU	HPPG-SFU-TU077A-014	Total/NA	Solid	Dry and Grind	

### Prep Batch: 514236

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42364-1	HPPG-F-065	Total/NA	Solid	Fill_Geo-21	513637
160-42364-2	HPPG-F-066	Total/NA	Solid	Fill_Geo-21	513637
160-42364-3	HPPG-SFU-TU077A-001	Total/NA	Solid	Fill_Geo-21	513640
160-42364-4	HPPG-SFU-TU077A-002	Total/NA	Solid	Fill_Geo-21	513637
160-42364-5	HPPG-SFU-TU077A-003	Total/NA	Solid	Fill_Geo-21	513637
160-42364-6	HPPG-SFU-TU077A-004	Total/NA	Solid	Fill_Geo-21	513637
160-42364-7	HPPG-SFU-TU077A-005	Total/NA	Solid	Fill_Geo-21	513640
160-42364-8	HPPG-SFU-TU077A-006	Total/NA	Solid	Fill_Geo-21	513640
160-42364-9	HPPG-SFU-TU077A-007	Total/NA	Solid	Fill_Geo-21	513637
160-42364-10	HPPG-SFU-TU077A-008	Total/NA	Solid	Fill_Geo-21	513637
160-42364-11	HPPG-SFU-TU077A-009	Total/NA	Solid	Fill_Geo-21	513637
160-42364-12	HPPG-SFU-TU077A-010	Total/NA	Solid	Fill_Geo-21	513637
MB 160-514236/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514236/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-42364-12 DU	HPPG-SFU-TU077A-010	Total/NA	Solid	Fill_Geo-21	513637

Eurofins TestAmerica, St. Louis

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Rad**

**Prep Batch: 514243**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42364-17	HPPG-SFU-TU077A-015	Total/NA	Solid	Fill_Geo-21	513637
160-42364-18	HPPG-SFU-TU077A-016	Total/NA	Solid	Fill_Geo-21	513637
160-42364-19	HPPG-SFU-TU077A-017	Total/NA	Solid	Fill_Geo-21	513640
160-42364-20	HPPG-SFU-TU077A-018	Total/NA	Solid	Fill_Geo-21	513640
160-42364-21	HPPG-SFU-TU077A-019	Total/NA	Solid	Fill_Geo-21	513637
160-42364-22	HPPG-SFU-TU077A-020	Total/NA	Solid	Fill_Geo-21	513637
160-42364-23	HPPG-SFU-TU077A-021	Total/NA	Solid	Fill_Geo-21	513637
160-42364-24	HPPG-SFU-TU077A-022	Total/NA	Solid	Fill_Geo-21	513637
160-42364-25	HPPG-SFU-TU077A-023	Total/NA	Solid	Fill_Geo-21	513637
160-42364-26	HPPG-SFU-TU077A-024	Total/NA	Solid	Fill_Geo-21	513640
160-42364-27	HPPG-SFU-TU077A-025	Total/NA	Solid	Fill_Geo-21	513637
MB 160-514243/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514243/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-42364-27 DU	HPPG-SFU-TU077A-025	Total/NA	Solid	Fill_Geo-21	513637

**Prep Batch: 514265**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42364-13	HPPG-SFU-TU077A-011	Total/NA	Solid	Fill_Geo-21	513637
160-42364-14	HPPG-SFU-TU077A-012	Total/NA	Solid	Fill_Geo-21	513640
160-42364-15	HPPG-SFU-TU077A-013	Total/NA	Solid	Fill_Geo-21	513640
160-42364-16	HPPG-SFU-TU077A-014	Total/NA	Solid	Fill_Geo-21	513640
MB 160-514265/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514265/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-42364-16 DU	HPPG-SFU-TU077A-014	Total/NA	Solid	Fill_Geo-21	513640

**Prep Batch: 519394**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42364-3	HPPG-SFU-TU077A-001	Total/NA	Solid	DPS-7	513640
160-42364-13	HPPG-SFU-TU077A-011	Total/NA	Solid	DPS-7	513637
160-42364-23	HPPG-SFU-TU077A-021	Total/NA	Solid	DPS-7	513637
MB 160-519394/23-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-519394/1-A	Lab Control Sample	Total/NA	Solid	DPS-7	

Eurofins TestAmerica, St. Louis

# Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42364-1  
SDG: GJ46599762

**Method: 905 - Strontium-90 (GFPC)**

Matrix: Solid

Prep Type: Total/NA

## Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Sr (40-110)	Y (40-110)
160-42364-3	HPPG-SFU-TU077A-001	90.4	92.6
160-42364-13	HPPG-SFU-TU077A-011	83.7	90.8
160-42364-23	HPPG-SFU-TU077A-021	91.0	90.8
LCS 160-519394/1-A	Lab Control Sample	85.3	92.3
MB 160-519394/23-A	Method Blank	84.0	92.6

## Tracer/Carrier Legend

Sr = Sr Carrier

Y = Y Carrier



Environment Testing  
America

## ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

Laboratory Job ID: 160-42404-1  
Laboratory Sample Delivery Group: D1189444  
Client Project/Site: HPNS-Parcel G 501197

For:  
Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Rose Condit

*Rhonda Ridenhower*

---

Authorized for release by:  
7/31/2021 10:32:26 AM

Rhonda Ridenhower, Client Service Manager  
(314)298-8566  
Rhonda.Ridenhower@Eurofinset.com

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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

**Job ID: 160-42404-1**

**Laboratory: Eurofins TestAmerica, St. Louis**

**Narrative**

## CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: HPNS-Parcel G 501197**

**Report Number: 160-42404-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### RECEIPT

The samples were received on 06/12/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at

## Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

### Job ID: 160-42404-1 (Continued)

#### Laboratory: Eurofins TestAmerica, St. Louis (Continued)

receipt was 23.5 C.

#### **STRONTIUM-90 (GFPC)**

Sample HPPG-SFU-TU077A-B-001 (160-42404-1) was analyzed for Strontium-90 (GFPC) in accordance with EPA 905. The samples were dried on 06/15/2021, prepared on 07/20/2021 and analyzed on 07/29/2021.

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-519394/23-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Sample HPPG-SFU-TU077A-B-001 (160-42404-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 06/15/2021, prepared on 06/17/2021 and analyzed on 07/08/2021.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

#### Inferred from      Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

The MB z-score for Ti-208 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances.

The cesium-137 and/or radium-226 detection goal of 0.0700/0.200 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline. (160-42406-A-24-B) and (160-42406-A-24-C DU) (160-42406-A-24-B) and (160-42406-A-24-C DU)

The replicate precision for Ra-226/Bi-214 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# CHAIN OF CUSTODY

Ref. Document # 501197RSY-065

Page 1 of 2

## APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520

Project Manager: Lisa Bercik  
Phone # (619)213-3389

Send Report to: Rose Condit  
Phone/Fax Number: 415-987-  
0760  
Address: 4005 Port Chicago  
Hwy

Sample Lead: Rizzo, Trevor  
Sample Tech(s): Trevor Rizzo

Project Number: 501197

Hunters Point Naval Shipyard, Parcel

Project Name: G Remedial Action

Project Location: San Francisco, CA

Purchase Order #: 1165058

Shipment/Pickup Date: 6/10/2021

Waybill Number: 11957 0225 9294

Test America (St. Louis Lab)  
13715 Rider Trail North  
Earth City, MO 63046

Lab Contact Name/Ph # Rhoeda Ridembower (314)298-8566

Spec 17

Special Instructions:

21 day ingrowth results only

Collection Information				Matrix	# of Containers	Preservatives (soil)	Preservatives (water)	Container Type	Dose Rate uR/Hr	Evidence Bag ID	Comment
Sample ID	Date	Time	Method								
HPCG-SFU-HU07A-B-091	6/9/2021	09:47	G	SO	1	16 oz Plastic Jar	X	X	X	S	Off-Site

Turnaround Time:				3-day <input type="checkbox"/>	10-Day <input type="checkbox"/>	28-day <input type="checkbox"/>	Other <input type="checkbox"/>	Level of QC Required:	I	II	III	Project Specific
Method Codes: G = Grab	DW = Drinking Water	GW = Ground Water	SL = Sludge	GN = Glass	CP = Chip Samples	A = Air	AS = Asbestos	PO = Pipe Sampling				
Relinquished By:	Relinquisher Signature:	Received Date Time:	Received By:	Relinquish Date Time:	Received By:	Received Signature:	Received Date Time:					
Locked Storage (RKillpack)		06/10/2021 14:18	Stacy Hatch		06/10/2021 14:18		06/10/2021 14:18					
Stacy Hatch		06/10/2021 15:20	Trevor Rizzo		06/10/2021 16:44	SHIPPED TO LAB		06/10/2021 15:20				
Trevor Rizzo		06/10/2021 16:44	SHIPPED TO LAB		06/12/21 0825		06/12/21 0825					

\*\*\* Last 3 transfers shown above - Complete list of transfers on last page \*\*\*



160-42404 Chain of Custody

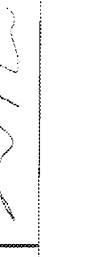
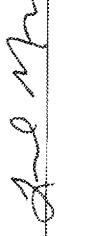
7/31/2021

1 2 3 4 5 6 7 8 9 10 11 12

ED\_006360A\_00000162-00125

# All Transfers for COC 501197RSY-065

Page 2 of 2

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Rizzo, Trevor		06/09/2021 16:10	Locked Storage (RKlippack)		06/09/2021 16:10
Locked Storage (RKlippack)		06/10/2021 14:18	Stacy Hatch		06/10/2021 14:18
Stacy Hatch		06/10/2021 15:20	Trevor Rizzo		06/10/2021 15:20
Trevor Rizzo		06/10/2021 16:44	SHIPPEDTOLAB		6/12/21 0825





# Sampling Activity Daily Log

# Sampling Activity Daily Log

Date	<u>7/19/87</u>	<u>2+</u>	<u>6/9/31</u>
Instruments	2221#	++3356	282967
Model 19#	<u>2268</u>	<u>67</u>	<u>916</u>
Start	<u>1240</u>	<u>2093</u>	<u>3 STOP</u>

Project Name: HPNS Parcel G      Sampler: Trevor Rizzo  
Field Activity Subject: Biased Sampling RSY 2 Use 1  
Survey Number: HPRS-06093021-064 - 335 - 632  
S0197254 - 65

Sample Number/ ID:	Sample Description	Sample Collection Date:	Sample Collection Time:	Gamma		Exposure Rate $\mu\text{R}/\text{hr}$		Surveyor Initials
				Surface	6 inch depth	18 cm above contact (sample)	4	
HPPG-SFU-TU077A-B-001	SOIL	6/19/12	0947	10820	12056	4	4	TB12

Notes.

Reinquished by:

Received by:

Date \_\_\_\_\_  
Time \_\_\_\_\_

Line.

Time

'31/202'

## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42404-1

SDG Number: D1189444

**Login Number:** 42404

**List Source:** Eurofins TestAmerica, St. Louis

**List Number:** 1

**Creator:** Mazariegos, Leonel A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Definitions/Glossary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

## Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

## Method Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

Method	Method Description	Protocol	Laboratory
905	Strontium-90 (GFPC)	EPA	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-7	Preparation, Digestion/Precipitate Separation (7-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

**Protocol References:**

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

**Laboratory References:**

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

## Sample Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-42404-1	HPPG-SFU-TU077A-B-001	Solid	06/09/21 09:47	06/12/21 08:25

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
 SDG: D1189444

**Client Sample ID: HPPG-SFU-TU077A-B-001**

**Lab Sample ID: 160-42404-1**

Date Collected: 06/09/21 09:47

Matrix: Solid

Date Received: 06/12/21 08:25

## Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	-0.0359	U	0.183	0.183	0.331	0.153	pCi/g	07/20/21 12:00	07/29/21 14:11	1
<b>Carrier</b>										
Sr Carrier	89.8		40 - 110					07/20/21 12:00	07/29/21 14:11	1
Y Carrier	91.7		40 - 110					07/20/21 12:00	07/29/21 14:11	1

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.528		0.151	0.160		0.0255	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Actinium-227	-0.253	U	0.581	0.582		0.336	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Americium-241	0.0624	U	0.142	0.142		0.115	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Bismuth-212	0.000	U	0.447	0.447		0.487	pCi/g	06/17/21 09:57	07/08/21 06:05	1
<b>Bismuth-214</b>	<b>0.463</b>		0.113	0.123		0.0465	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Cesium-137	0.000	U	0.0297	0.0297	0.0700	0.0384	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Lead-210	0.616	U	1.57	1.57		1.26	pCi/g	06/17/21 09:57	07/08/21 06:05	1
<b>Lead-212</b>	<b>0.488</b>		0.0837	0.105		0.0327	pCi/g	06/17/21 09:57	07/08/21 06:05	1
<b>Lead-214</b>	<b>0.452</b>		0.101	0.112		0.0441	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Potassium-40	5.97		1.30	1.43		0.448	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Protactinium-231	0.000	U	0.197	0.197		2.05	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Protactinium-234	-0.108	U	0.300	0.300		0.244	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Radium-226	0.463		0.113	0.123	0.200	0.0465	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Radium-228	0.528		0.151	0.160		0.0255	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Thallium-208	0.203		0.0486	0.0530		0.0111	pCi/g	06/17/21 09:57	07/08/21 06:05	1
<b>Thorium 228</b>	<b>0.488</b>		0.0837	0.105		0.0327	pCi/g	06/17/21 09:57	07/08/21 06:05	1
<b>Thorium-232</b>	<b>0.528</b>		0.151	0.160		0.0255	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Thorium-234	0.169	U	0.364	0.364		0.990	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Uranium-235	0.000	U	0.174	0.174		0.458	pCi/g	06/17/21 09:57	07/08/21 06:05	1
Uranium-238	0.169	U	0.364	0.364		0.990	pCi/g	06/17/21 09:57	07/08/21 06:05	1

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

## Method: 905 - Strontium-90 (GFPC)

**Lab Sample ID:** MB 160-519394/23-A

**Matrix:** Solid

**Analysis Batch:** 520677

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 519394

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Strontium-90	0.04134	U	0.0605	0.0606	0.331	0.0468	pCi/g	07/20/21 12:00	07/29/21 19:09	1
<b>Carrier</b>										
<i>Sr Carrier</i> 84.0      40 - 110      07/20/21 12:00      07/29/21 19:09      1										
<i>Y Carrier</i> 92.6      40 - 110      07/20/21 12:00      07/29/21 19:09      1										

**Lab Sample ID:** LCS 160-519394/1-A

**Matrix:** Solid

**Analysis Batch:** 520677

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 519394

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Result	Qualifier									
Strontium-90	2.44		2.352			0.252	0.331	0.0451	pCi/g	96	75 - 125
<b>Carrier</b>											
<i>Sr Carrier</i> 85.3      40 - 110      07/20/21 12:00      07/29/21 19:09      1											
<i>Y Carrier</i> 92.3      40 - 110											

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID:** MB 160-514687/1-A

**Matrix:** Solid

**Analysis Batch:** 517673

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 514687

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac	
	Result	Qualifier									
Actinium 228	0.1093		0.0802	0.0809		0.0292	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Actinium-227	-0.1242	U		0.470	0.470	0.273	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Americium-241	0.03377	U		0.0788	0.0788	0.0620	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Bismuth-212	0.05403	U		0.760	0.760	0.621	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Bismuth-214	0.07099			0.0655	0.0659	0.0401	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Cesium-137	-0.01799	U		0.0464	0.0464	0.0700	0.0360	pCi/g	06/17/21 09:57	07/08/21 07:50	1
Lead-210	-0.6111	U		1.36	1.36		1.09	pCi/g	06/17/21 09:57	07/08/21 07:50	1
Lead-212	0.0000	U		0.0423	0.0423	0.0793	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Lead-214	0.08227			0.0746	0.0751	0.0510	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Potassium-40	0.009089	U		0.404	0.404	0.323	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Protactinium-231	0.4513	U		1.19	1.19		1.31	pCi/g	06/17/21 09:57	07/08/21 07:50	1
Protactinium-234	0.05045	U		0.146	0.146	0.117	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Radium-226	0.07099			0.0655	0.0659	0.200	0.0401	pCi/g	06/17/21 09:57	07/08/21 07:50	1
Radium-228	0.1093			0.0802	0.0809	0.0292	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Thallium-208	0.05449			0.0329	0.0333	0.0201	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Thorium 228	0.0000	U		0.0423	0.0423	0.0793	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Thorium-232	0.1093			0.0802	0.0809	0.0292	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Thorium-234	0.2487	U		0.451	0.452	0.451	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Uranium-235	0.0000	U		0.121	0.121	0.219	pCi/g	06/17/21 09:57	07/08/21 07:50	1	
Uranium-238	0.2487	U		0.451	0.452	0.451	pCi/g	06/17/21 09:57	07/08/21 07:50	1	

Eurofins TestAmerica, St. Louis

# QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-514687/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 517672

Prep Batch: 514687

Analyte	Spike Added	LCS		Total		DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Uncert. (2σ+/-)	LOQ				
Americium-241	96.3	101.2		11.9		0.600	pCi/g	105	87 - 116
Cesium-137	26.4	29.16		3.07	0.0700	0.134	pCi/g	111	87 - 120
Cobalt-60	8.79	9.430		1.00		0.0606	pCi/g	107	87 - 115

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

Rad

Leach Batch: 514371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42404-1	HPPG-SFU-TU077A-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 514687

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42404-1	HPPG-SFU-TU077A-B-001	Total/NA	Solid	Fill_Geo-21	514371
MB 160-514687/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514687/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 519394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42404-1	HPPG-SFU-TU077A-B-001	Total/NA	Solid	DPS-7	514371
MB 160-519394/23-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-519394/1-A	Lab Control Sample	Total/NA	Solid	DPS-7	

# Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42404-1  
SDG: D1189444

**Method: 905 - Strontium-90 (GFPC)**

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr (40-110)	Y (40-110)
160-42404-1	HPPG-SFU-TU077A-B-001	89.8	91.7
LCS 160-519394/1-A	Lab Control Sample	85.3	92.3
MB 160-519394/23-A	Method Blank	84.0	92.6

**Tracer/Carrier Legend**

Sr = Sr Carrier  
Y = Y Carrier

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